Module 8B

Windows 2000 Professional

8.1B OBJECTIVES

Students will be able to:

- Identify the hardware requirements for installing Windows 2000 Professional
- Identify the required installation information you need to successfully install Microsoft 2000 Professional
- Install Windows 2000 Professional from a CD-ROM
- Describe the function and components of the Microsoft Management Console, including snap-ins, console options, and modes
- Managing hardware profiles
- Using the control panel to configure the display
- Describe Disk Management Concepts
- Describe the role and purpose of user accounts
- Create a local user account
- Describe the key features of groups
- Describe local groups
- Create and delete local groups
- Add members to local groups
- Remove users from local groups
- Describe the Microsoft Windows 2000 built-in groups
- Define Microsoft Windows 2000 printing terms
- Identify the requirements for setting up a network printer and network printing resources
- Add and share a new printer for a local print device or a network-interface print device
- Set up client computers
- Make a connection to a network printer using the Add Printer Wizard or a Web browser
- Share an existing printer
- Create a printer pool
- Set priorities between printers

8.2B OVERVIEW

This module's aim is to make you familiar and comfortable with managing Windows 2000 Professional in everyday work situations. We'll cover what's needed before installing, configuring, and customizing Windows 2000 Professional. Windows 2000 Professional has many improvements over Windows NT 4.0.

A Windows 2000 Professional installation is significantly less cumbersome than previous corporate operating systems delivered by Microsoft. Windows 2000 Professional works with more different kinds of hardware, and provides a more stable and reliable personal computing "desktop" platform. Everyday hardware such as printers, PDA's, USB devices, and monitors install with ease because Windows 2000 Professional was developed with Plug and Play technology pioneered from Windows 95/Windows 98. Windows 2000 can automatically schedule maintenance tasks in the background, to keep itself tuned up

and in good running condition. We'll also learn about using tools to manage users, groups, disks, and configuration settings. We'll also learn about printing devices used with windows 2000 professional.

8.3B BEFORE INSTALLING WINDOWS 2000 PROFESSIONAL

When you install Windows 2000 Professional, the Windows 2000 Setup program asks you to provide information about how you want to install and configure the operating system. Good preparation helps you avoid problems during and after the installation.

- **At the completion of this lesson, you will be able to complete the following pre-installation tasks:**
    - Identify the hardware requirements for installing Windows 2000 Professional
    - Identify the required installation information you need to successfully install Microsoft Windows 2000 Professional.

8.4B PRE-INSTALLATION TASKS

Before you begin the installation, the following pre-installation tasks should be completed:

- Identify the hardware requirements to install Windows 2000 Professional, and make sure that your hardware meets these requirements
- Ensure your hardware is on the Hardware Compatibility List (HCL)
- Decide how you want to partition the hard disk on which you are going to install Windows 2000
- Choose a file system for the installation partition (FAT, FAT32 or NTFS)
- Identify whether your computer will join a domain or a workgroup
- Complete a checklist of pre-installation tasks to help ensure a successful installation

8.5B HARDWARE REQUIREMENTS

You must know the minimum hardware requirements for installing and operating Windows 2000 Professional in order to determine whether your hardware meets these requirements. Using the Figure and Table below, verify that your hardware meets or exceeds these minimum hardware requirements.

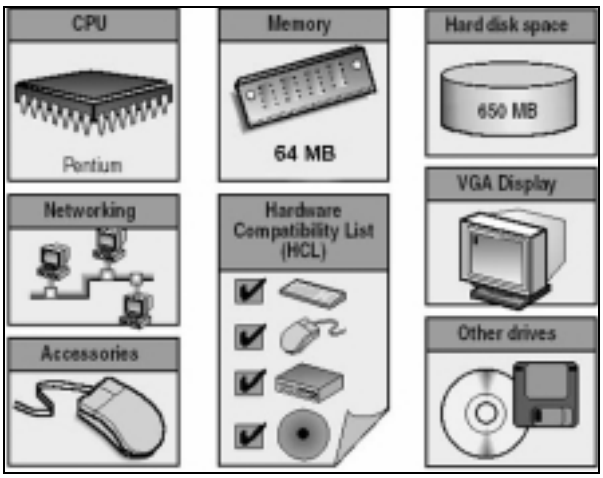


Figure 8-1B. Minimum hardware requirements

Component	Requirements
CPU	Pentium based (133 MHz minimum)
Memory	64 MB recommended Minimum
Hard-disk space	2 GB hard disk with a minimum of 650 MB on the partition that will contain the system files
Networking	Network adapter card compatible with your network if performing network installation
Display	Video display adapter and monitor with Video Graphics Adapter (VGA) resolution or higher (SVGA recommended)
Other drives	CD-ROM drive (12X or faster recommended). *Note: CD-ROM drive is not required for installing Windows 2000 over a network
Accessories	Keyboard and mouse

Table 8-1B. Windows 2000 Professional Hardware Requirements

8.6B HARDWARE COMPATIBILITY LIST (HCL)

Before you install Windows 2000, you must verify that your hardware is on the Windows 2000 Hardware Compatibility List. Microsoft provides tested drivers for only those devices that are included on this list. Using hardware not listed on the HCL may cause problems during and after installation. For a copy of the HCL, see the Hcl.txt file in the Support folder on the Windows 2000 Professional CD-ROM.

You will also find the most recent versions of the HCL for released operating systems on the Internet at the Microsoft Web site (http://www.microsoft.com/hcl/default.asp).

NOTE:

Microsoft supports only those devices that are listed on the HCL. If you have hardware that isn't on this list, contact the hardware manufacturer to determine whether a manufacturer-supported Windows 2000 driver exists for the component.

8.6.1B DISK PARTITIONS

The Windows 2000 Setup program examines the hard disk to determine its existing configuration. Next, Setup lets you choose whether to install Windows 2000 on an existing partition or to create a new partition on which to install Windows 2000.

8.6.2B CREATING A NEW PARTITION OR USING AN EXISTING PARTITION

The Setup program gives you flexibility in configuring the hard disk prior to installing Windows 2000. Depending on the state of the hard disk, you may choose one of the following options during the installation:

- If the hard disk is not partitioned, you must create and size the Windows 2000 partition.
- If the hard disk has partitions and has enough unpartitioned disk space, you may create a new Windows 2000 partition by using the unpartitioned space.
- If the hard disk has an existing partition that is large enough, you may choose to install Windows 2000 on that partition. Beware though, because installing on an existing partition will overwrite any existing data.
- If the hard disk has an existing partition, you can delete it to create more unpartitioned disk space to use to create the Windows 2000 partition.

8.6.3B CONFIGURING THE REMAINING FREE HARD DISK SPACE

Although Setup may be used to create other partitions, you should create and size only the partition on which you will install Windows 2000. After you install Windows 2000, you may use the Disk Management administrative tool to partition any remaining unpartitioned space on the hard disk.

Microsoft recommends that you install Windows 2000 on a 1 GB or larger partition. Although Windows 2000 requires at least 650 MB of disk space for installation, using a larger partition for installation provides flexibility in the future. By installing to a 1 GB or larger partition, you have the option of installing updates to Windows 2000, operating system tools, or other files that are required by Windows 2000.

8.7B FILE SYSTEMS

After creating the installation partition, Setup prompts you to select the file system with which to format the partition. Windows 2000 supports three file systems: Windows 2000 file system (NTFS), file allocation table (FAT), and FAT32. The Figure below summarizes some of the features of these file systems.

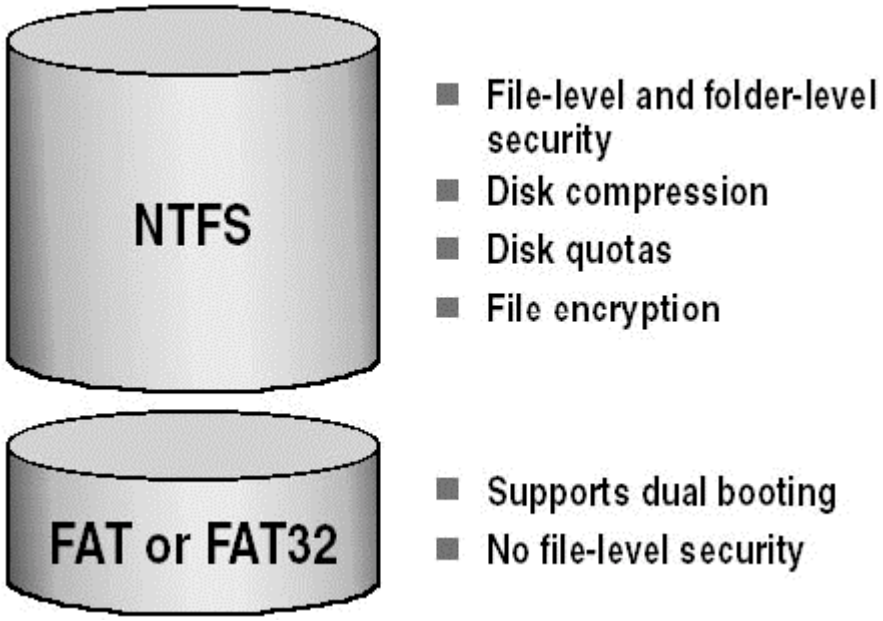


Figure 8-2B. File System Features

8.7.1B NTFS

If the partition you are installing to requires any of the following, you should use NTFS as your file system:

- **File-level and folder-level security –** NTFS allows you to control access to files and folders.
- **Disk compression –** NTFS compresses files to store more data on the partition.
- **Disk quotas –** NTFS allows you to control disk use on a per-user basis.
- **Encryption –** NTFS allows you to encrypt file data on the physical hard disk. NTFS in Windows 2000 also supports remote storage, dynamic volumes, and the mounting of volumes to folders. Windows 2000 and Windows NT are the only operating systems that can access data on a local hard disk that is formatted with NTFS.

8.7.2B FAT AND FAT32

FAT and FAT32 allow access by other operating systems. If you wish to dual boot Windows 2000 and another operating system, you must format the system partition with either FAT or FAT32.

Setup determines whether to format the hard disk with FAT or FAT32 based on the size of the installation partition.

Partition size	Format
Smaller than 2 GB	Setup formats the partition as FAT
Larger than 2 GB	Setup formats the partition as FAT32

FAT and FAT32 don't offer many of the best features that NTFS supports—for example, file-level security. Therefore, in most situations, you should format the hard disk with NTFS. The only reason to use FAT or FAT32 is for dual booting. If you are setting up a computer for dual booting, you would have to format only the system partition as FAT or FAT32. For example, if drive C is the system partition, you could format drive C as FAT or FAT32 and format drive D as NTFS.

NOTE:

If you will dual boot the system, the older version of MS Windows must be installed prior to adding Windows 2000.

8.8B LICENSING

In addition to the license that is required to install and run Windows 2000 Server and the license that is required to install and run an operating system on each client computer, you must also have a license for each client connection to the server.

8.8.1B CLIENT ACCESS LICENSE

A Client Access License (CAL) gives client computers permission to connect to computers running Windows 2000 Server so that the client computers can connect to network services, shared folders, and print resources. When Windows 2000 Server is installed, the network administrator must choose one of two CAL modes: Per Seat or Per Server.

The following services do not require Client Access Licenses:

- Anonymous or authenticated access to Windows 2000 Server with Microsoft Internet Information Services (IIS) version 4 or a Web-server application that provides Hypertext Transfer Protocol (HTTP) sharing of Hypertext Markup Language (HTML) files.
- Telnet and File Transfer Protocol (FTP) connections.

  NOTE:

  If your company uses Microsoft BackOffice products, you must also have licenses for them. A Windows 2000 license doesn't cover BackOffice products.

8.8.2B PER SEAT LICENSING

The Per Seat licensing mode requires a separate CAL for each client computer that is used to access Windows 2000 Server for basic network services. After a client computer has a CAL, it can be used to access any computer running Windows 2000 Server on the enterprise network. Per Seat licensing is often more economical for large networks where client computers are used to connect to more than one server.

8.8.3B PER SERVER LICENSING

With Per Server licensing, CALs are assigned to a particular server. Each CAL allows one connection per client computer to the server for basic network services. You must have at least as many CALs that are dedicated to the server as the maximum number of client computers that will be used to concurrently connect to that server at any time.

Per Server licensing is preferable for small companies that have only one computer running Windows 2000 Server. It is also useful for Internet or remote-access servers where client computers might not be licensed as Windows 2000 network client computers. In this situation, Per Server licensing allows you to specify a maximum number of concurrent server connections and reject any additional logon attempts.

8.9B DOMAIN OR WORKGROUP MEMBERSHIP

During the installation, you must choose which type of network security group that you want the computer to join: a domain or a workgroup. This is illustrated in Figure 8.3B.

8.9.1B JOINING A DOMAIN

During installation, you may add the computer on which you are installing Windows 2000 Professional to an existing domain. Adding a computer to a domain is referred to as *joining a domain.*

Joining a domain during installation requires the following:

- **A domain name.** Ask the domain administrator for the Domain Name System (DNS) name for the domain that you want to join. An example of a DNS-compatible domain name is yahoo.com, where *yahoo* is the name of your organization's DNS identity.

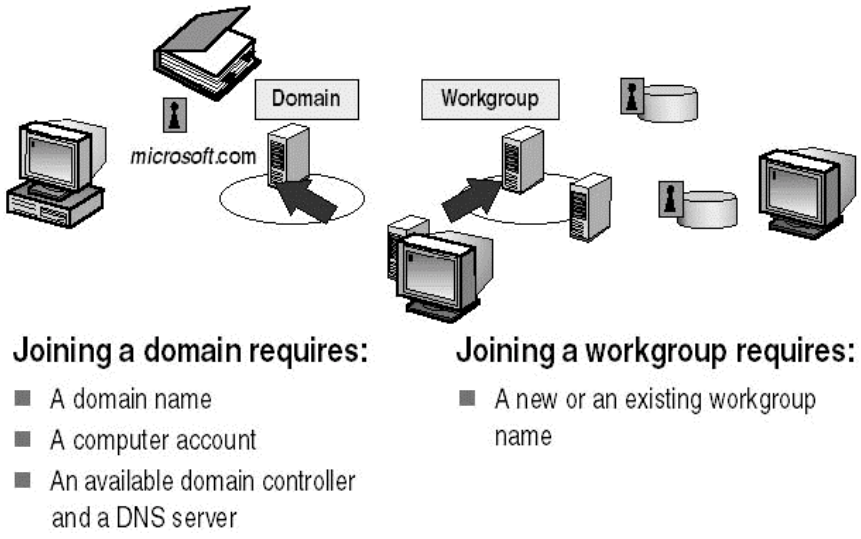


Figure 8-3B. Domain or Workgroup Membership

- **A computer account.** Before a computer can join a domain, it must have a computer account in the domain. You can ask a domain administrator to create the computer account before installation, or, if you have administrative privileges for the domain, you can create the computer account during installation. If you create the computer account during installation, Setup prompts you for a name and password of a user account with authority to add domain computer accounts.

- **An available domain controller and a server running the DNS Service (called the *DNS server*).** At least one domain controller in the domain that you are joining and one DNS server must be online in order for you join a computer to the domain.

  NOTE:

  You can join a domain during installation or after installation.

8.9.2B JOINING A WORKGROUP

During installation, you can add the computer on which you are installing Windows 2000 Professional to an existing workgroup. Adding a computer to a workgroup is referred to as *joining a workgroup.*

NOTE:

When you install Windows 2000 Server and join a workgroup, the computer is added as a stand-alone server. Any computer running Windows 2000 Server that isn't a member of a domain is called a *stand-alone server.*

When you join a workgroup during installation, you must assign a workgroup name to your computer. The workgroup name that you assign can be the name of an existing workgroup or the name of a new workgroup that you create during installation.

8.10B PRE-INSTALLATION CHECKLIST

The following is a pre-installation checklist that you may use to make sure you have all the necessary information available before you begin installing Windows 2000 Professional.

Task	Done
Verify that your system components meet the minimum hardware requirements.	
Verify that all of your hardware is listed on the HCL.	
Verify that the hard disk on which you will install Windows 2000 has a minimum of 650 MB of free disk space, and preferably at least 1 GB.	
Select the file system for the Windows 2000 partition. Unless you will dual boot operating systems or you have clients running operating systems other than Windows NT or Windows 2000 that need to access information on this computer, you should format all partitions with NTFS.	
Determine the name of the domain or workgroup that you will join. If you are joining a domain, be sure that you write down the DNS name for the domain. Also, determine the name of the computer before installation.	
Create a computer account in the domain that you are joining. You can create a computer account during the installation if you have administrative privileges in the domain.	
Create a password for the Administrator account.	

Table 8-2B. Pre-installation Checklist

8.11B LESSON SUMMARY

In this lesson, we identified the pre-installation tasks you must understand and complete before installing Windows 2000. The first task is identifying the hardware requirements for installing Windows 2000 Professional and ensuring that your hardware meets these requirements. You learned about the Windows 2000 hardware compatibility list and that your hardware should be on the HCL so that it's compatible with Windows 2000.

After you have verified that your hardware is on the HCL, you must decide how to partition the hard disk on which you are going to install Windows 2000. You must also determine whether you are going to format the partition as NTFS so that you can have better security and a richer feature set, or as FAT or FAT32 so that other operating systems can access the data on the installation partition.

In addition, you learned about Client Access Licenses (CALs) and that a CAL gives client computers—for example, a computer running Windows 2000 Professional—the right to connect to computers running Windows 2000 Server. You learned that you must select Per Seat or Per Server licensing on the server. With Per Seat licensing mode, a separate CAL is required for each client computer that accesses a Windows 2000 Server. When a client computer has a CAL, it can be used to access any computer running Windows 2000 Server on the enterprise network. With Per Server licensing, CALs are assigned to a particular server. Each CAL allows one connection per client computer to the server, and you must have at least as many CALs that are dedicated to the server as the maximum number of client computers that will be used to concurrently connect to that server at any time.

You also learned that during installation, your computer must join a domain or a workgroup. If your computer is the first one installed on the network, or if for some other reason no domain is available for your computer to join, you must join the computer to a workgroup and then have the computer join a domain after the installation. This lesson also provided a checklist of pre-installation tasks that you should complete to help ensure a successful installation of Windows 2000.

8.12B INSTALLING MS WINDOWS 2000 PROFESSIONAL FROM A CD-ROM

This lesson teaches you the four-stages of installing Windows 2000 Professional from a CD-ROM. These four stages are as follows:

- Run the Setup program
- Run the Setup wizard
- Install Windows networking
- Complete the Setup program

After you learn about these four stages, you will install Windows 2000 on your computer.

- **After this lesson, you will be able to Install Windows 2000 Professional from a CD-ROM.**

8.12.1B THE WINDOWS 2000 SETUP PROGRAM

Installing Windows 2000 is a four-stage process. You begin by running the Setup program that prepares the hard disk and copies files. Then, Setup runs a graphical user interface (GUI) wizard that provides informational pages, which you use to complete the rest of the installation. The four stages of the installation process are described as follows:

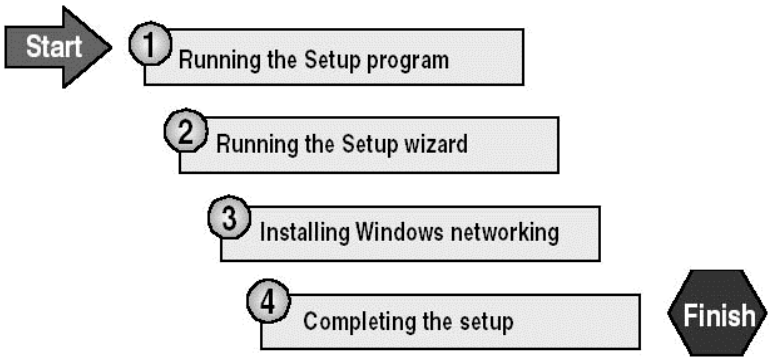


Figure 8-4B. Windows 2000 Installation Steps

Installing Windows 2000 from a CD-ROM to a clean hard disk consists of these four stages:

1. **Run the Setup program:**

   The Setup program prepares the hard disk for the installation and copies the necessary files to run the GUI Setup wizard. This is called the text mode portion of setup.

2. **Run the Setup wizard:**

   The Setup wizard requests certain information about the computer, including names, passwords, regional settings, and so on. This is called the graphics mode portion of setup.

3. **Install Windows networking:**

   Once Setup has gathered information about the computer, the Setup wizard prompts you for networking information and then installs the networking components to enable the computer to communicate with other computers on the network.

4. **Complete the Setup program:**

   To complete the installation, Setup copies files to the hard disk, registers components, and configures the computer. The system restarts after installation is complete.

8.12.2B RUNNING THE SETUP PROGRAM

To start Setup, you have two options. You may use the Setup boot disks, or you may simply use the CD-ROM. For boot disk installation: Insert the disk labeled Setup Boot Disk (Disk 1) into drive A, and then turn on, or restart, the computer and follow the prompts. If your computer supports booting from a CD-ROM drive, you may start the installation by booting off of the Windows 2000 CD-ROM.

The following steps describe running the Setup program on a clean disk drive. This is illustrated in the Figure below.

1. Once the computer starts, a minimal version of Windows 2000 is copied into memory. This version of Windows 2000 starts the Setup program.

2. Setup starts the text-based version of the Setup program. This version of Setup prompts you to read and accept an end-user licensing agreement (EULA).

3. Setup prompts you to select the partition on which to install Windows 2000. You may select an existing partition or create a new partition by using unpartitioned space on the hard disk. You also have the options of deleting a partition, if necessary, and reconfiguring the hard disk's partitions.

4. After you create the installation partition, Setup prompts you to choose a file system for the new partition and formats the partition with the selected file system.

5. After formatting the Windows 2000 partition, Setup copies files to the hard disk and saves configuration information.

6. Setup restarts the computer and then starts the graphical Windows 2000 Setup wizard. By default, the Windows 2000 operating system files are installed to the C:\Winnt folder.

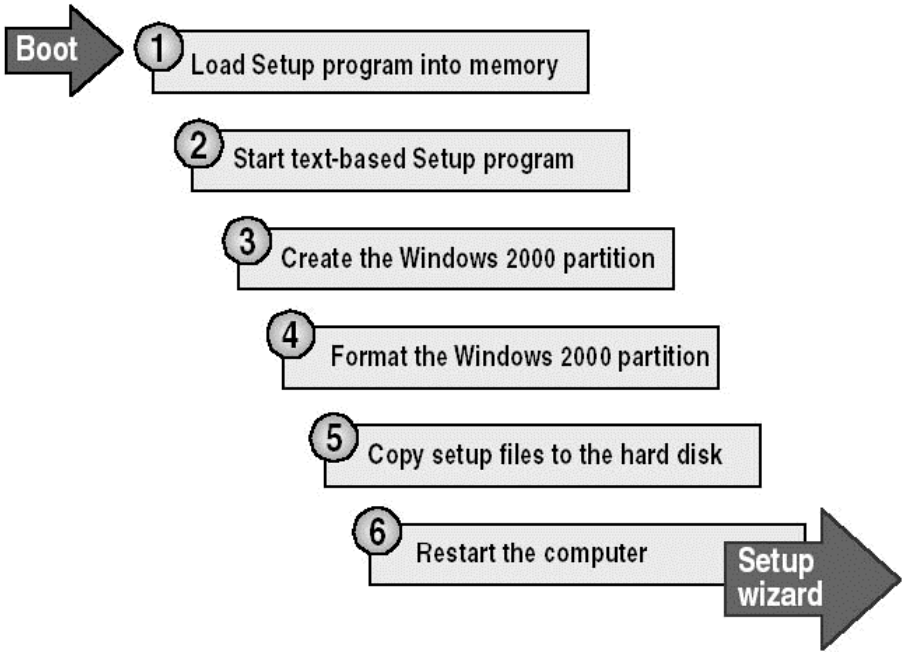


Figure 8-5B. Steps in the Setup Program

8.12.3B RUNNING THE SETUP WIZARD

The graphical based Windows 2000 Setup wizard guides you through the next stage of installation. It gathers information about you, your organization, and your computer.

After installing Windows 2000 security features and installing and configuring devices, the Windows 2000 Setup wizard asks you to provide the following information:

- **Regional settings –** Customize language, locale, and keyboard settings. You may configure Windows 2000 to use multiple languages and regional settings.
- **Name and organization –** Enter the name of the person and the organization to which this copy of Windows 2000 is licensed.
- **Your Product Key –** Enter the 25-character Product Key that is on the sticker affixed to the back of your CD case.
- **Computer name –** Enter a computer name of up to 15 characters. The computer name must be different from any other computer, workgroup, or domain names on the network. The Windows 2000 Setup wizard displays a default name, based on the organization name that you entered earlier in the setup process.
- **Password for the Administrator account –** Specify a password for the Administrator user account, which the Windows 2000 Setup wizard creates during installation. The Administrator account provides all the administrative privileges that are required to manage the computer.
- **Modem dialing information –** Select the country or region where the computer is located. Often this is already completed, based on the selected regional settings. You also must enter the

area (or city) for the computer's location as well as the number for obtaining an outside line, if applicable. Finally, select whether your phone system is tone dialing or pulse dialing.

NOTE:

You won't be prompted to enter modem dialing information during installation if a modem isn't attached to the computer and powered up on which you are installing Windows 2000 Professional.

- **Date and time settings –** If necessary, set the current date and time and select the correct time zone for your computer's location. These settings will most likely already be set correctly. You may also select whether to have Windows 2000 automatically adjust the computer's clock setting for daylight saving changes.

After this stage in the installation is completed, the Windows 2000 Setup wizard starts to install the Windows networking components.

8.12.4B INSTALLING WINDOWS NETWORKING COMPONENTS

After gathering information about your computer, the Windows 2000 Setup program automatically installs the networking software.

The following list describes the steps in which Windows 2000 Professional installs networking components:

1. **Detect network adapter cards –** Windows 2000 detects and configures any network adapter cards that are installed on the computer.

2. **Install networking components – W**indows 2000 installs (copies) files that allow your computer to connect to other computers, networks, and the Internet. Then the Setup program prompts you to choose whether to use typical settings or customized settings to configure the following networking components:

    - **Client for Microsoft Networks –** This component allows your computer to gain access to network resources.

    - **File and Printer Sharing for Microsoft Networks –** This component allows other computers to gain access to file and print resources on your computer.

    - **TCP/IP –** This protocol is the default networking protocol that allows your computer to communicate over local area networks (LANs) and wide area networks (WANs).

    You may also install other clients, services, and network protocols (such as NetBIOS Enhanced User Interface [NetBEUI], AppleTalk, and NWLink IPX/SPX/NetBIOS-compatible transport) any time after installing Windows 2000.

3. **Join a workgroup or domain –** If you create a computer account in the domain for your computer during the installation, the Windows 2000 Setup wizard prompts you for the name and password of a user with permissions to add computer accounts to the network.

4. **Install components –** The Windows 2000 Setup wizard installs and configures the Windows networking components that you selected.

8.12.5B COMPLETING THE INSTALLATION

After installing the networking components, the Windows 2000 Professional Setup wizard copies additional files to configure Windows 2000 Professional. Then the Setup program automatically begins the fourth step in the installation process to perform a set of final tasks. This is illustrated in the Figure below.

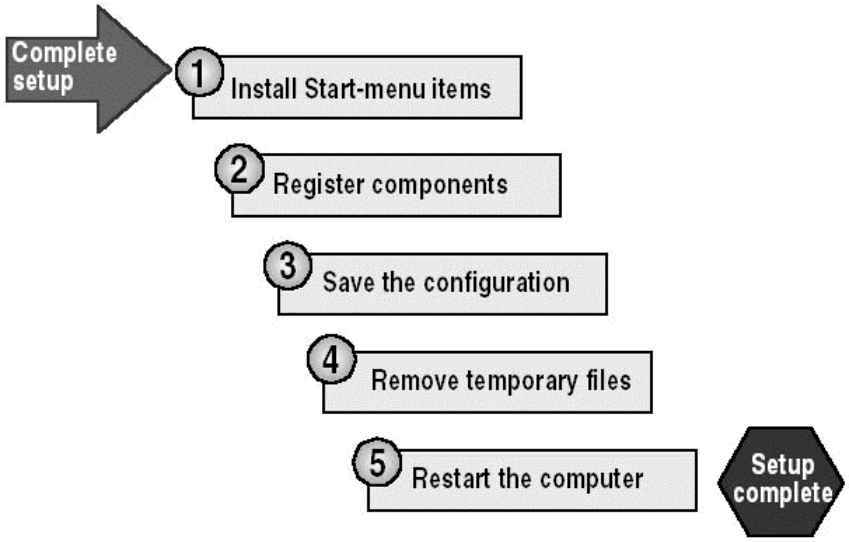


Figure 8-6B. Final Steps in Completing Windows 2000 Installation

The following list describes the tasks that Setup performs to complete the installation stage:

1. **Installs Start-menu items –** The Setup program sets up shortcuts that will appear on the Start menu.

2. **Registers components –** Setup applies the configuration settings that you specified in the Windows 2000 Setup wizard.

3. **Saves the configuration –** Setup saves your configuration settings to the local hard disk. The next time that you start Windows 2000, the computer will automatically use this configuration.

4. **Removes temporary files –** To conserve hard disk space, Setup deletes any files that it installed for use only during installation.

5. **Restarts the computer –** After completing the preceding steps, setup restarts the computer. This completes the installation of Windows 2000 Professional on a client or stand-alone system from a CD-ROM.

8.13B INTRODUCING THE MICROSOFT MANAGEMENT CONSOLE (MMC)

This lesson introduces you to the MMC and defines consoles, console trees, details panes, snap-ins, and extensions. This lesson also covers the differences between Author/User modes. It discusses the .MSC

file extension assigned to the consoles you create and the My Administrative Tools folder where the consoles you create are stored. The My Administrative Tools folder can be accessed from the Programs menu and offers easy access to the consoles that you create.

- **After this lesson, you will be able to describe the function and components of the Microsoft Management Console, including snap-ins, console options, and modes.**

8.13.1B MICROSOFT MANAGEMENT CONSOLES

One of the primary administrative tools that you can use to manage Windows 2000 is the Microsoft Management Console. The MMC provides a standardized method to create, save, and open administrative tools, which are called *consoles*. The MMC doesn't provide management functions itself, but rather is a program that hosts management applications, called *snap-ins*, which you use to perform one or more administrative tasks. Additionally, The MMC is a great troubleshooting tool.

The MMC allows you to do the following:

- **Administer tasks and troubleshoot problems –** You can perform many administrative tasks and troubleshoot many problems by using only the MMC. Using one consistent interface saves time instead of having to use multiple interfaces.

- **Centralize administration –** You may use consoles to perform the vast majority of your administrative tasks from a single computer.

- **Administer tasks and troubleshoot problems remotely.** You can also use most snap-ins for remote administration and troubleshooting. Not all snap-ins are available for you to use on remote computers, but Windows 2000 prompts you with a dialog box when you can use the snap-in remotely.

  NOTE:

  Third-party vendors can design their administrative tools as snap-ins for use in the MMC.

  Consoles contain one or more snap-ins, and are saved as files that have the .MSC extension. All the settings for the snap-ins contained in the console are saved and are restored when the file is opened, even if the console file is opened on a different computer or network.

  You configure consoles to hold snap-ins to perform specific tasks. Console options determine how a console operates. By using console options, you may develop consoles for other administrators to use from their own computers to perform specific tasks.

8.13.1.1B CONSOLE TREE AND DETAILS PANE

Every console has a console tree. A *console tree* displays the hierarchical organization of the snap-ins contained within that console. As you can see in the Figure below, this console contains the Disk Defragmenter snap-in and the Device Manager On Local Computer snap-in.

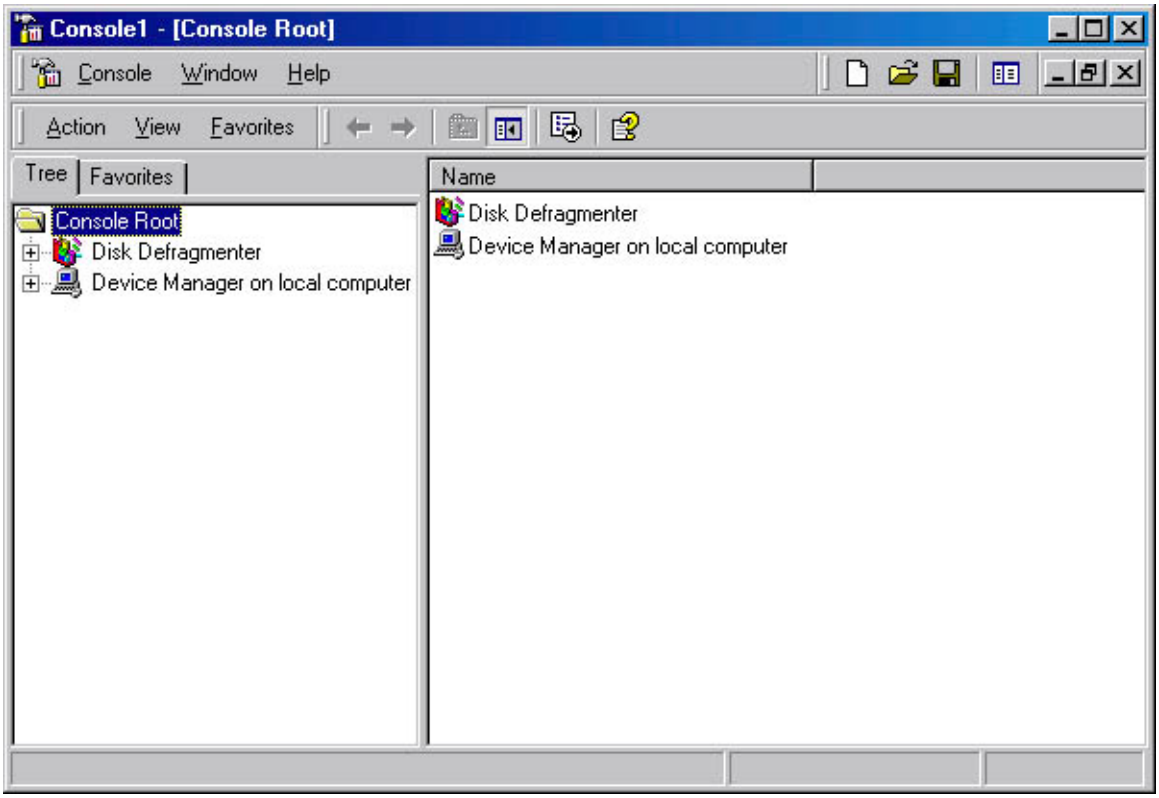


Figure 8-7B. MMC Window

The console tree organizes snap-ins that are a part of a console. This allows you to quickly locate a specific snap-in. Snap-ins that you add to the console tree appear under the console root. The *details pane* shows the contents of the active snap-in.

Every console contains an Action menu and a View menu. The options on these menus vary, depending on the current selection in the console tree.

8.13.2B ADMINISTRATIVE TOOLS

By default, Windows 2000 saves custom console files (with an .MSC extension) in the Administrative Tools folder. Assuming that your Windows 2000 Professional operating system is on drive C and that you are logged on as Administrator, the path to these files would be C:\Documents and Settings\Administrator\Start Menu\Programs\Administrative Tools. The folders below C:\Documents and Settings don't exist until the first time a user logs on.

Even after the folder structure is created for a new user who logs on for the first time, the Administrative Tools folder may not show up on the Programs menu if its display is turned off, which it is by default when Windows 2000 Professional is installed. (To turn on its display without using MMC, click Start, point to Settings, click Taskbar & Start Menu, and place a checkmark in the Display Administrative Tools check box on the Advanced tab of the Taskbar And Start Menu Properties dialog box.) However, when you run MMC and save a custom console, Windows 2000 turns on the display of the Administrative Tools folder for every user.

NOTE:

In Windows 2000 Server, the private folder containing the consoles you create are in the My Administrative Tools folder. There is an Administrative Tools folder, but it holds some preconfigured consoles for use with the MMC.

8.13.3B SNAP-INS

Snap-ins are applications designed to work in the MMC. You can use snap-ins to perform administrative tasks. There are two types of snap-ins: stand-alone snap-ins and extension snap-ins.

8.13.3.1B STAND-ALONE SNAP-INS

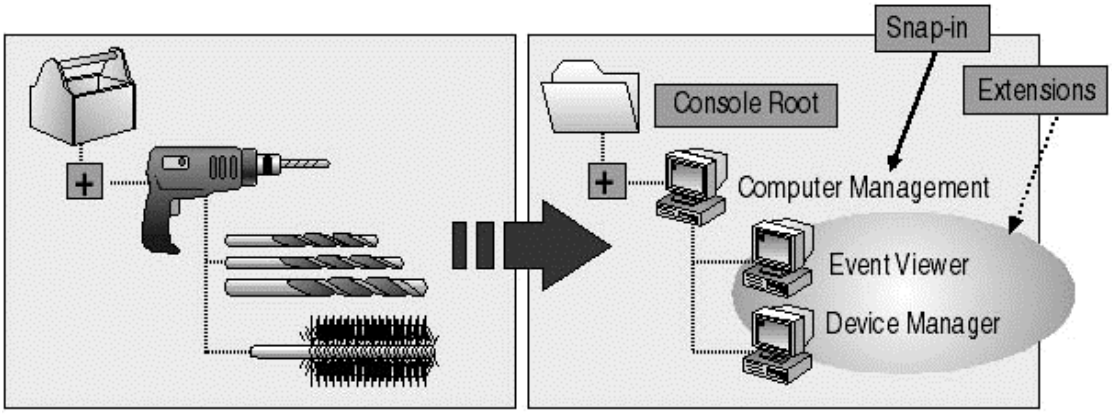
Stand-alone snap-ins are generally referred to simply as snap-ins. Use stand-alone snap-ins to perform Windows 2000 administrative tasks. Each snap-in provides one function or a related set of functions. Windows 2000 Server comes with standard snap-ins, and Windows 2000 Professional includes a smaller set of standard snap-ins.

8.13.3.2B EXTENSION SNAP-INS

Extension snap-ins are commonly referred to as *extensions*. These are snap-ins that provide additional administrative functionality to another snap-in. The following are some characteristics of extensions:

- Extensions may work with only one or with multiple stand-alone snap-ins, based on the function of the stand-alone snap-in.
- When you add an extension, Windows 2000 displays only extensions that are compatible with the stand-alone snap-in. Windows 2000 places the extensions in the appropriate location within the stand-alone snap-in.
- By default, when you add a snap-in to a console, MMC adds all available extensions. You can remove any of the extensions from the snap-in.
- You can add an extension to multiple snap-ins.

The figure below demonstrates the idea of snap-ins and extensions. A toolbox holds a drill. You can use a drill with its standard drill bit. You can perform additional functions with different drill bits. The same is true for snap-ins and extensions.



- Snap-ins are administrative tools.
- Extensions provide additional functionality to snap-ins.
  - Extensions are preassigned to snap-ins.
  - Multiple snap-ins may use the same extensions.

Figure 8-8B. Snap-ins and Extensions

8.13.3.3B CONSOLE OPTIONS

Some stand-alone snap-ins can use extensions that provide even more functionality, for example, Computer Management. However, some snap-ins, like Event Viewer, may act as a snap-in or an extension.

Use console options to establish how each console operates by choosing the appropriate *console mode.* The console mode determines the console functionality for the person who is using a saved console. There are two available console modes: *Author mode* and *User mode*.

8.13.3.4B AUTHOR MODE

If you save a console in Author mode, you enable full access to all MMC functionality, which includes the ability to modify the console. Save the console using Author mode to allow those using it to do the following:

- Add or remove snap-ins
- Create new windows
- View all portions of the console tree
- Save consoles

NOTE:

All new consoles are saved in Author mode by default.

8.13.3.5B USER MODE

Usually, if you plan to distribute a console to other administrators, you will save the console in User mode. When you set a console to User mode, users aren't able to add snap-ins to, remove snap-ins from, or save the console. Three types of User modes exist, which allow different levels of access and functionality. Table 8.1B describes when to use each mode.

Use	When
Full Access	You wish to allow users to have all MMC functionality. This includes the ability to add or remove snap-ins, to create new windows, to create task pad views and tasks, and to access all portions of the console tree.
Delegated Access, Multiple Windows	You don't wish to permit users to open new windows or gain access to a portion of the console tree. You want to allow users to view multiple windows in the console.
Delegated Access, Single Window	You do not want users to open new windows or gain access to a portion of the console tree. You want to allow users to view only one window in the console.

Table 8-3B. Console User Modes

8.13.4B LESSON SUMMARY

In this lesson, you learned that the Microsoft Management Console (MMC) is one of the primary administrative tools that you use to manage Windows. The MMC provides a uniform method to create, save, and open administrative tools called consoles. Consoles hold one or more applications called snap-ins, which you will use to perform various administrative tasks and to troubleshoot problems locally and on remote computers. By default, Windows 2000 Professional saves custom console files (with an .MSC extension) in the Administrative Tools folder of the user who created it.

You learned that every console has a console tree. The console tree shows the hierarchical organization of the snap-ins contained within that console. This allows you to quickly locate a particular snap-in. The details pane shows the contents of the active snap-in. You also learned about the two types of snap-ins: stand-alone snap-ins and extension snap-ins. A stand-alone snap-in is commonly referred to as a snap-in and provides one function or a related set of functions. An extension snap-in is commonly referred to as an extension, and it provides additional administrative functionality to a snap-in. An extension is intended to work with one or more stand-alone snap-ins, based on the function of the stand-alone snap-in.

Finally, in this lesson you learned about console options. You use console options to establish how each console operates by selecting the proper console mode. The two console modes are Author mode and User mode. When you save a console in Author mode, you allow full access to all MMC functionality, which includes modifying the console. You save the console using Author mode to enable those using it to add or remove snap-ins, create new windows, view all portions of the console tree, and save consoles. If you plan to distribute a console to other administrators, you will typically save it in User mode. When a console is to User mode, users can't add snap-ins to, remove snap-ins from, or save the console.

8.14B USING WINDOWS CONTROL PANEL - CONFIGURING HARDWARE SETTINGS

The Control Panel is used to configure hardware settings, manage user-specific settings, and manage global settings (settings that apply to the computer regardless of which user is currently logged on). This lesson introduces the Control Panel programs that you use to configure hardware devices or services. You configure hardware settings by creating and configuring hardware profiles.

- **After this lesson, you will be able** to manage hardware profiles.

8.14.1B UNDERSTANDING HARDWARE PROFILES

A *hardware profile* stores configuration settings for a set of devices and services. Windows 2000 can store various hardware profiles to meet the user's various needs. For example, a portable computer can use different hardware configurations depending on whether it is docked or undocked. A portable-computer user may create a hardware profile for each state (docked and undocked) and then select the appropriate profile when starting Windows 2000.

8.14.2B CREATING OR MODIFYING A HARDWARE PROFILE

To create or modify a hardware profile in Control Panel, double-click the System icon, and then click the Hardware tab in the System Properties dialog box. Click Hardware Profiles to see the Available Hardware Profiles list. This is demonstrated in the Figure below.

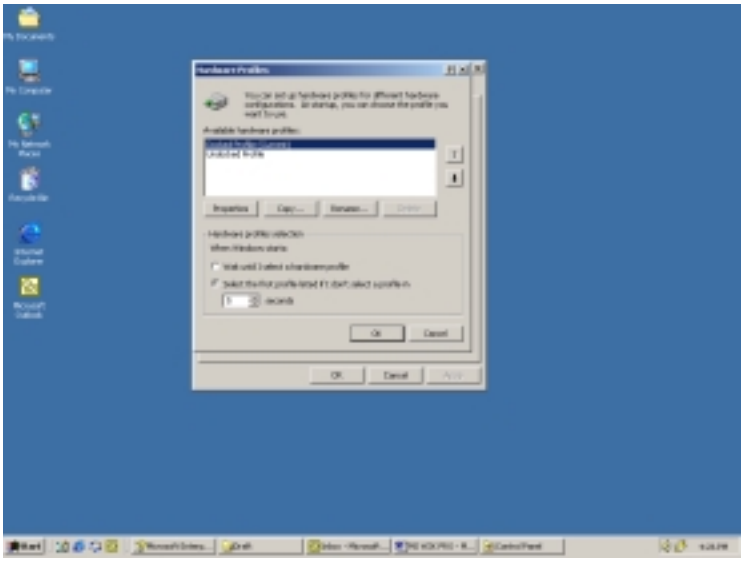


Figure 8-9B. The Available Hardware Profiles List

TIP:

To open the System Properties dialog box from the desktop, simply right-click on the My Computer icon, and then click Properties.

Windows 2000 creates an initial profile during installation, which is listed as Profile 1 (Current). You may create a new profile with the same configuration as another profile. To create a new profile, in the Hardware Profiles dialog box, in the Available Hardware Profiles list, select the profile that you want to duplicate, and then click Copy.

The order of the profiles in the Available Hardware Profiles list determines the default order at startup. The first profile in the list is used as the default profile. Use the arrows to the right of the list box to change the order of the profiles.

8.14.3B ACTIVATING A HARDWARE PROFILE

If two or more profiles are available in the Available Hardware Profiles list, Windows 2000 prompts users to select a profile during startup. You can change the time that the computer waits before starting with the default configuration. To adjust this time delay, click the Select The First Profile Listed If I Don't Select A Profile In option and then indicate the number of seconds in the Seconds box within the Hardware Profiles Selection group. You can configure Windows 2000 to automatically start the default profile by setting the number of seconds to 0. Press the Spacebar at the system prompt if you wish to override the default during startup.

When using hardware profiles, be cautious not to disable one of the boot devices with the Devices program in Control Panel. If you disable a required boot device, Windows 2000 may not start. You should always make a copy of the default profile and then make changes to the new profile. This way, you can still use the default profile if a problem occurs.

8.14.4B VIEWING HARDWARE PROFILE PROPERTIES

To view the properties for a hardware profile, in the Available Hardware Profiles list, select a profile, and then click Properties. Windows displays the Properties dialog box for this profile.

If Windows 2000 identifies your computer as a portable system, the This Is A Portable Computer check box is selected. If Windows 2000 determines that your portable computer is docked, it automatically chooses the appropriate option. You can't alter this docked option setting after Windows 2000 selects it.

8.14.5B LESSON SUMMARY

In this lesson, you learned to use the System icon in Control Panel to configure hardware devices or services by creating and configuring hardware profiles. A hardware profile stores configuration settings for a set of devices and services. During installation, Windows 2000 creates an initial profile, but you have the option to create additional profiles. To create a new profile, in the Hardware Profiles dialog box, in the Available Hardware Profiles list, you select the profile that you want to copy and then click Copy, and modify that profile. To view the properties for a hardware profile, in the Available Hardware Profiles list, you select a profile and then click Properties. This displays the Properties dialog box for that profile.

You also learned that the order of the profiles in the Available Hardware Profiles list determines the default order at startup. The first profile in the list becomes the default profile. To edit the order of the profiles, you use the arrows. If two or more profiles are in the Available Hardware Profiles list, Windows 2000 prompts you to choose a profile during startup.

8.15B CONFIGURING THE DISPLAY

Users who have appropriate permissions to load and unload device drivers can install and test video drivers. Video resolutions can be changed on the fly in Windows 2000 without the need to reboot.

- **After this lesson, you will be able to use Control Panel to configure the display.**

8.15.1B SETTING DISPLAY PROPERTIES

To view or modify the display properties, in Control Panel, double-click the Display icon, and then click the Settings tab. Alternatively, you can also right-click your desktop and select Properties from the shortcut menu. You will then see the screen shown in the Figure below. The number of colors, video resolution, font size, and refresh frequency can all be configured here.

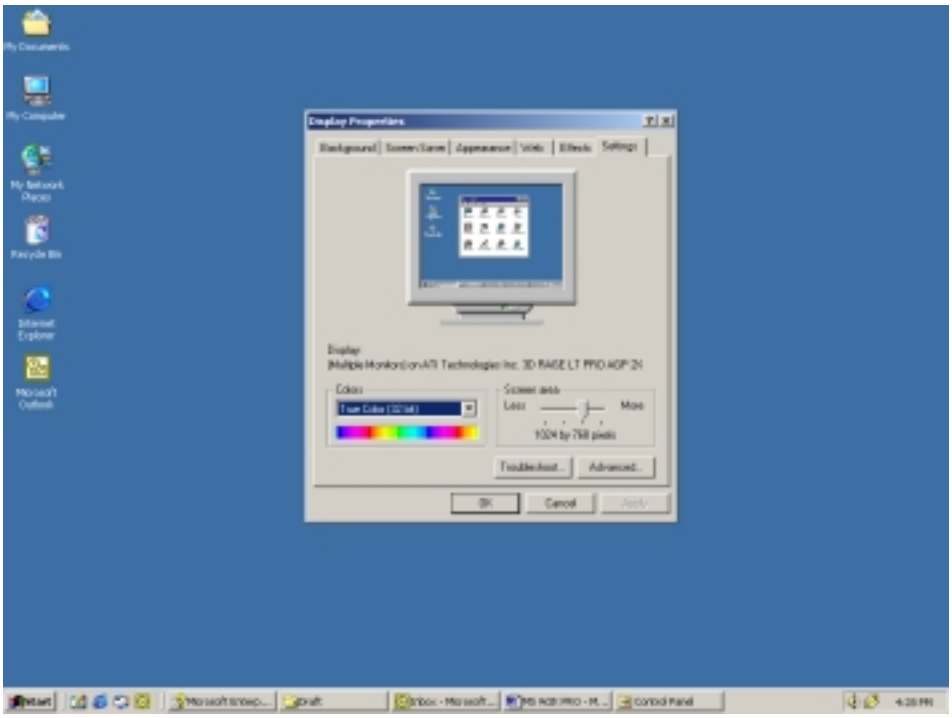


Figure 8-10B. Settings Tab of the Display Properties Dialog Box

The Table below details the various options available on the Settings tab for configuring the display settings.

Option	Description
Colors	Lists color depths for the display adapter
Screen Area	Allows you to set the resolution for the display adapter
Troubleshoot	Opens the Display Troubleshooter to aid in correcting display problems
Advanced	Opens the Properties dialog box for the display adapter, as described in the following section

Table 8-4B. Settings Tab Options for Configuring the Display

To open the Properties dialog box for the display adapter, click Advanced. The Table below details the display adapter options.

Tab	Option group	Description
General	Display	Provides the Small Font, Large Font, and Other options. The Other option allows you to choose any custom font size you want.
	Compatibility	Lets you decide what Windows 2000 does when you change display settings. After you change the color settings, you must choose one of the following options: • Restart The Computer Before Applying The New Display Settings. • Apply The New Display Settings Without Restarting. • Ask Me Before Applying The New Display Settings.
Adapter	Adapter Type	Lists the manufacturer and model number of the installed adapter. The Properties button gives additional information including device status, resource settings, and whether there are any conflicting devices.
	Adapter Information	Provides more information about the display adapter, such as video chip type, digital-to-analog converter (DAC) type, memory size, and BIOS.
	List All Modes	Displays all compatible modes for your display adapter and allows you to select the resolution, color depth, and refresh frequency in one step.
Monitor	Monitor Type	Provides the manufacturer and model number of the monitor currently installed. The Properties button provides more information and gives access to the Display Troubleshooter to help in resolving problems with this device.

	Monitor Settings	Permits you to configure the refresh rate frequency. This option only applies to high-resolution drivers. Make certain not to select a refresh rate/screen resolution combination that is unsupported by the monitor. If you are unsure, check your monitor documentation, or select the lowest refresh rate option.
Troubleshooting	Hardware Acceleration	Lets you incrementally decrease your display hardware's acceleration features to help in isolating and eliminating display problems.
Color Management		Allows you to choose the color profile for your monitor.

Table 8-5B. Advanced Display Adapter Options

8.15.2B LESSON SUMMARY

In this lesson, you learned that users with permission to load and unload device drivers can also install and test video drivers. In Windows 2000, you can change video resolutions on the fly without restarting the system.

You also learned that you use the Display icon in Control Panel to view or change display properties, such as the number of colors, video resolution, font size, and refresh frequency. This lesson concluded with a section to help you troubleshoot multiple displays.

8.16B INTRODUCTION TO DISK MANAGEMENT

In this lesson, you will learn principles of disk management. For example, if there is free space on your hard disk, it must be partitioned and formatted so that you can store data on that part of the disk. Additionally, if you have more than one hard disk, each disk must be partitioned and formatted before you can store data on it.

- **After this lesson, you will be able to describe disk management concepts.**

8.16.1B SETTING UP A HARD DISK

Whether you are configuring the remaining free space on a hard disk on which you installed Windows 2000 or setting up a new one, you must be aware of the tasks that are involved. Before you can store data on a new hard disk, you must take the following steps to prepare the disk:

1. Initialize the disk with a storage type. Initialization defines the fundamental structure of a hard disk. Windows 2000 supports basic storage and dynamic storage.

2. Create partitions on a basic disk or create volumes on a dynamic disk.

3. Format the disk. After you create a partition or volume, you have to format it with a specific file system. You must choose between NTFS file system, FAT, or FAT32.

The file system that you choose affects disk operations, including: how you control user access to data, how data is stored, hard disk capacity, and which operating systems can gain access to the data on the disk.

Before deciding how to perform the tasks of setting up a hard disk, you have to understand the storage types, partition types, and volume types available in Windows 2000.

8.16.1.1B STORAGE TYPES

Windows 2000 supports two types of disk storage: basic storage and dynamic storage. A physical disk must be either basic or dynamic; you can't use both storage types on one disk. You can, however, use both types of disk storage in a multi-disk system.

8.16.1.2B BASIC STORAGE

The traditional industry standard for storage is *basic storage*. It specifies the division of a hard disk into partitions. This is illustrated in Figure 10.1. A *partition* is a section of the disk that functions as a physically separate unit of storage. Windows 2000 recognizes both primary and extended partitions. A disk that is set up for basic storage is known as a *basic disk*. A basic disk may contain primary partitions, extended partitions, and logical drives. Any new disks added to a computer running Windows 2000 are basic disks.

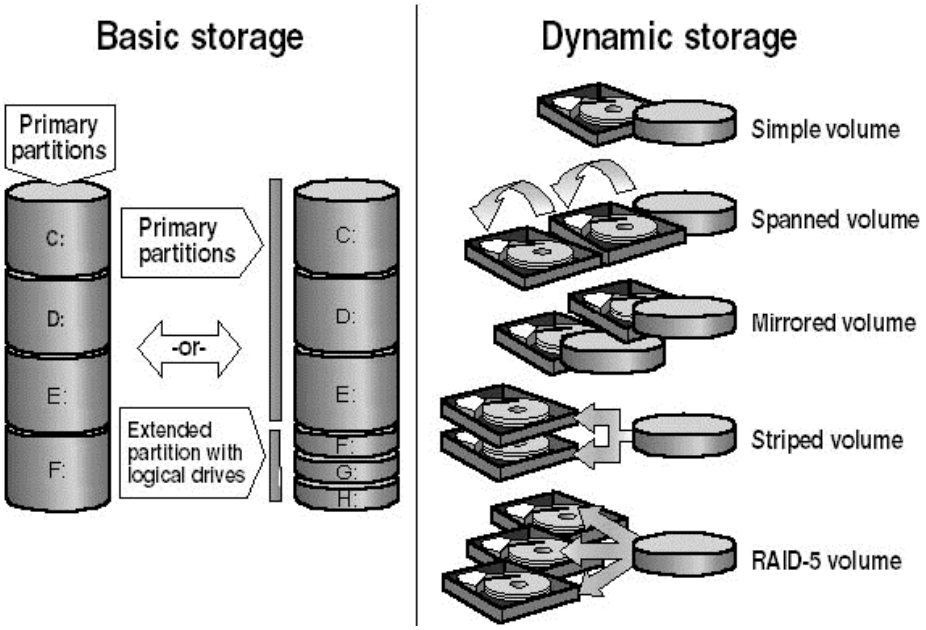


Figure 8-11B. Basic and Dynamic Storage

Because basic storage is the traditional industry standard, all versions of Microsoft Windows and MS-DOS support basic storage. For Windows 2000, basic storage is selected by default. Therefore, all disks are basic disks until you convert them to dynamic storage.

8.16.1.3B DYNAMIC STORAGE

Only Windows 2000 supports *dynamic storage*, which is a standard that creates a single partition that includes the entire disk. A disk that you initialize for dynamic storage is a *dynamic disk.*

Dynamic disks are separated into *volumes*, which can consist of a part, or parts, of one or more physical disks. On a dynamic disk, you can create simple volumes, spanned volumes, and striped volumes, as described later in this chapter. Dynamic disks are created by upgrading a basic disk.

Dynamic storage is far less limited than basic storage; for example, dynamic disks can be sized and resized without restarting Windows 2000.

NOTE:

Removable storage devices may contain primary partitions only. Extended partitions, logical drives, or dynamic volumes can't be configured on removable storage devices. Primary partitions on removable storage devices cannot be marked as active.

8.17B PARTITION TYPES (BASIC DISKS)

A basic disk can be divided into primary and extended partitions. *Partitions* function as physically separate storage units. This allows you to break up different types of information, such as user data on one partition and applications on another. A basic disk may contain a maximum of four partitions. These may be divided as follows: up to four primary partitions, or up to three primary partitions and one extended partition. Only one partition can be an extended partition, as shown in the Figure below.

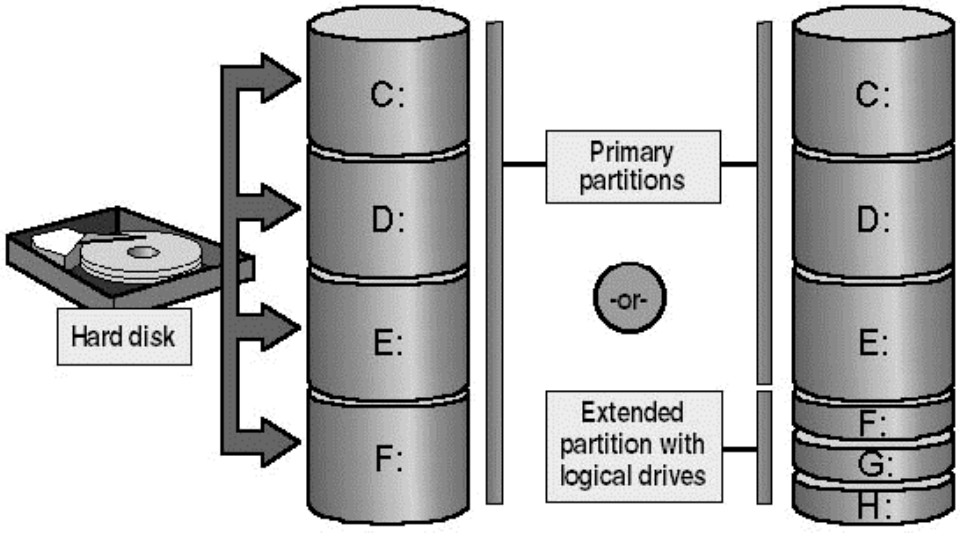


Figure 8-12B. Partition Types

8.17.1B PRIMARY PARTITIONS

Windows 2000 uses *primary partitions* to start the computer. Only a primary partition may be marked as the active partition. The active partition is where the hardware looks for the boot files to start the

operating system. Only one partition on a single hard disk can be active at a time. Multiple primary partitions allow you to separate different operating systems or types of data.

In order to dual boot Windows 2000 with Microsoft Windows 95 or MS-DOS, the active partition must be formatted as FAT because Windows 95 can't read a partition formatted as FAT32 or NTFS. To dual boot with Microsoft Windows 95 OSR2 or Windows 98, the active partition may be formatted as FAT or FAT32.

8.17.2B EXTENDED PARTITIONS

An *extended partition* is created from free space. There may be only one extended partition on a hard disk, so you should include all remaining free space in the extended partition. Unlike primary partitions, you don't format extended partitions or assign drive letters to them. You separate extended partitions into segments. Each segment is a logical drive, which is assigned a drive letter and formatted with a file system.

NOTE:

The Windows 2000 *system partition* is the active partition that contains the hardware-specific files required to load the operating system. The Windows 2000 *boot partition* is the primary partition or logical drive where the operating system files are installed. The boot partition and the system partition may be the same partition. However, the system partition must be on the active partition, typically drive C, while the boot partition could be on a different primary partition or on an extended partition.

8.17.3B VOLUME TYPES (DYNAMIC DISKS)

Basic disks can be converted to dynamic storage and then Windows 2000 volumes can be created. You must decide which volume type best suits your needs for efficient use of disk space and performance.

- A *simple volume* contains disk space from a single disk and isn't fault tolerant.
- A *spanned volume* includes disk space from up to 32 multiple disks. Windows 2000 writes data to a spanned volume on the first disk, completely filling the space, and continues in this manner through each disk included in the spanned volume. A spanned volume is not fault tolerant; if any disk in a spanned volume fails, the data in the entire volume is lost.
- A *striped volume* combines areas of free space from up to 32 multiple hard disks into one logical volume. In a striped volume, Windows 2000 adds data to all disks at the same rate, thereby optimizing performance. If a single disk in a striped volume fails, the data in the entire volume is lost.

  NOTE:

  Windows 2000 Server provides fault tolerance on dynamic disks. *Fault tolerance* is the ability of a computer or operating system to react to a catastrophic event without loss of data. Windows 2000 Server provides both mirrored volumes and RAID-5 volumes that are fault tolerant. Windows 2000 Professional, however, doesn't provide fault tolerance.

  You can efficiently arrange data for tasks such as backing up by creating multiple partitions or volumes on a single hard disk. For example, partition one-half of a hard disk for the operating

system and applications, and one-half for data. Then, when you back up your data, you back up the entire partition instead of just a specific folder.

8.17.4B FILE SYSTEMS

Windows 2000 supports the NTFS, FAT, and FAT32 file systems. NTFS is used when you require a partition to have file- and folder-level security, disk compression, disk quotas, or encryption. Only Windows 2000 and Windows NT can access data on a local hard disk that is formatted as NTFS. Furthermore, if you plan to promote a server to a domain controller, you must format the installation partition with NTFS.

FAT and FAT32 allow access by, and compatibility with, other operating systems. To dual boot Windows 2000 and another operating system, the system partition must be formatted as either FAT or FAT32. These file systems don't offer many of the features that NTFS supports, for example, file-level security. Therefore, in most situations, you will format the hard disk with NTFS. The only reason to use FAT or FAT32 is for dual booting.

If you have a volume that is formatted with FAT or FAT32, it can be reformatted to NTFS without reformatting the volume by using the Convert command available from Windows 2000. To do this you enter the following command in a Command Prompt window:

```
Convert volume /FS:NTFS /V
```

Note that *volume* is a placeholder for the drive letter followed by a colon. The /V indicates the command should be run in verbose mode. For example, if you wanted to convert drive C from FAT to NTFS you would type the following command:

```
Convert C: /FS:NTFS /V
```

8.17.5B THE DISK MANAGEMENT SNAP-IN

The Disk Management snap-in is used to configure and manage your network storage space. The Disk Management snap-in can display your storage system in either a graphical view or a list view. The display can be modified to suit your preferences by using the commands on the View menu.

8.17.6B LESSON SUMMARY

In this lesson, you learned that you must use the Disk Management snap-in to initialize the disk with a storage type before you can store data on a new hard disk. Windows 2000 supports basic storage and dynamic storage. A basic disk may contain primary partitions, extended partitions, and logical drives. All versions of Microsoft Windows and MS-DOS support basic storage. For Windows 2000, basic storage is the default, until you convert the disks to dynamic storage.

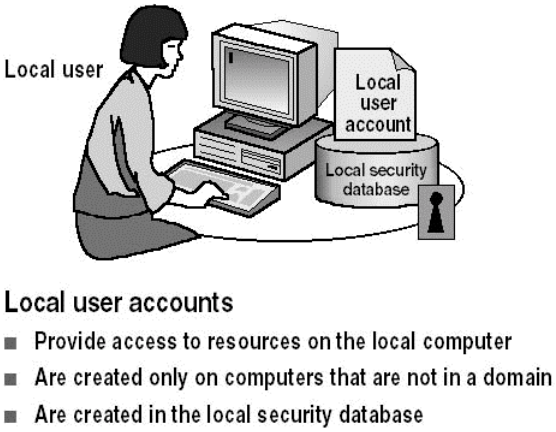
You also learned that dynamic storage creates a single partition that includes the entire disk. You divide dynamic disks into volumes, which can consist of a portion, or portions, of one or more physical disks. A dynamic disk can contain simple volumes, spanned volumes, and striped volumes. Dynamic storage

doesn't hold the limitations of basic storage. A dynamic disk can be sized and resized without restarting Windows 2000.

Then you learned that after creating partitions on a basic disk or creating volumes on a dynamic disk, the partition must be formatted with a specific file system such as NTFS, FAT, or FAT32. The file system that you choose affects disk operations, such as: how you control user access to data, how data is stored, how much hard disk capacity you have, and which operating systems can gain access to the data on the hard disk. The Disk Management snap-in is used to configure and manage network storage.

8.18B UNDERSTANDING & MANAGING USER ACCOUNTS AND GROUPS

8.18.1B USER ACCOUNTS



The three different types of user accounts offered by Microsoft Windows 2000 are: local user accounts, domain user accounts, and built-in user accounts. A *local user account* permits a user to log on to a specific computer in order to gain access to the resources on that system. A *domain user account* allows a user to log on to the domain to gain access to network resources. A *built-in user account* allows a user to perform administrative tasks or to gain access to local or network resources.

Figure 8-13B. Local User Accounts

- **After this lesson, you will be able to describe the role and purpose of user accounts.**

8.18.1.1B LOCAL USER ACCOUNTS

Users with a local user account on a particular machine are permitted to log on at and gain access to resources only on the specific machine on which they have a local user account. A local user account under Windows 2000 is created *only* in that computer's security database, called the *local security database,* as illustrated in the Figure below. Local user account information is not replicated to any other computer in Windows 2000. Once a user has a local account, the computer uses its local security database to authenticate the local user account, thereby allowing the user to log on to that system.

If you have a workgroup comprised of five computers running Windows 2000 Professional and you create a local user account—for example, UserX on ComputerX—you can log on to ComputerX only with the UserX account. If you need to be able to log on to all five of the computers in the workgroup as UserX, you must create a local user account, UserX, on each of the five computers. Furthermore, since UserX is a local account on each machine, if you need to change the password for UserX, it must be changed on each and every machine.

NOTE:

Local user accounts shouldn't be created on computers running Windows 2000 that are part of a domain because the domain does not recognize local user accounts. In order for a user to gain access to network resources within the domain, and to enable centralized management of the users, the user must have a domain user account.

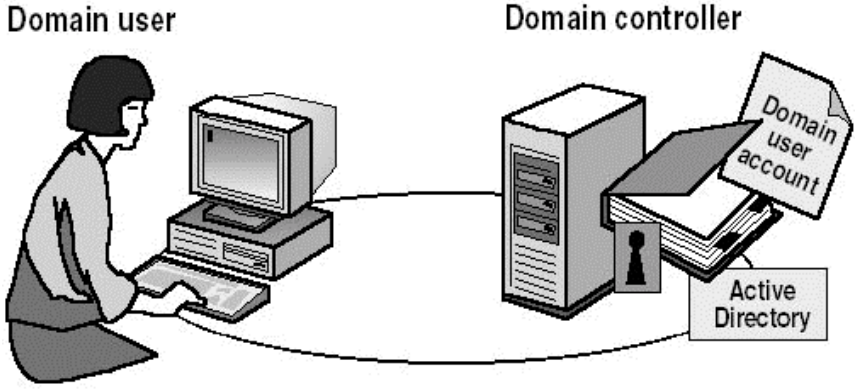
8.18.1.2B DOMAIN USER ACCOUNTS

Domain user accounts allow users to log on to the domain and gain access to network resources. Using the user's logon and password information, Windows 2000 authenticates the user and builds an access token containing information about the user and security settings. This token will be used for the duration of the logon session to identify the user to computers running Windows 2000 where the user tries to gain access to resources.

NOTE:

You must have a domain in order to have domain user accounts. You can have a domain only if you have at least one computer running at least one Windows 2000 Server that is configured as a domain controller, and has the directory services based on Active Directory installed.

Domain user accounts are created in the copy of the Active Directory database (the Directory) on a domain controller, as shown in Figure 8-14B. The domain controller replicates the new user account information to all domain controllers in the domain. After replication, any domain controller in the domain tree can authenticate the user during the logon process.



Domain user accounts

- Provide access to network resources
- Provide the access token for authentication
- Are created in Active Directory directory services on a domain controller

Figure 8-14B. Domain User Accounts

8.18.1.3B BUILT-IN USER ACCOUNTS

Some accounts, called *built-in* accounts, are created automatically by Windows 2000. Administrator and Guest are two commonly used built-in.

8.18.1.4B ADMINISTRATOR

The built-in Administrator account is used to manage the overall computer. If your computer is part of a domain, the built-in Administrator account is used to manage the domain configuration. Common tasks performed using the Administrator account include creating and modifying user accounts and groups, managing security policies, creating printers, sharing resources, and assigning permissions and rights to user accounts to gain access to resources.

If you are the administrator, you should create a user account that you use to perform non-administrative tasks and log on using the Administrator account only when you must perform administrative tasks.

NOTE:

The Administrator account cannot be deleted or removed. As a precaution, the built-in Administrator account should be renamed to provide greater security. Using a name that does not easily identify it as an administrator account will make it difficult for someone to guess which user account is the administrator.

8.18.1.5B GUEST

The built-in Guest account is generally used to give occasional users the ability to log on and gain access to resources.

NOTE:

By default, the Guest account is not enabled. The Guest account shouldn't be used in a high security network. If it is used, it should always be assigned a password. While the account may be renamed, it cannot be deleted.

8.18.2B LESSON SUMMARY

In this lesson, you learned that Microsoft Windows 2000 provides local user accounts and built-in user accounts. With a local user account, a user logs on to a specific system and gains access to resources only on that computer. With built-in user accounts, you can perform administrative tasks or acquire access to resources.

Windows 2000 local user accounts are created only in that computer's security database, called the local security database. If you need to access multiple computers in your workgroup, you must create an account on each of the computers in the workgroup. Additionally, you learned that Windows 2000 may create built-in user accounts.

You also learned that Windows 2000 provides domain user accounts if your computer is part of a domain. With a domain user account, a user may log on to the domain and gain access to network resources. Built-in user accounts that are domain user accounts are used to perform administrative tasks or gain access to network resources. A domain user account is crated in the copy of the Active Directory

database (the Directory) on a domain controller. The domain controller then replicates the new user account information to all domain controllers in the domain, simplifying user account administration.

8.19B CREATING USER ACCOUNTS

The Computer Management snap-in is used to create a new local user account. Remember that local user accounts are always created in the local security database of that computer.

After this lesson, you will be able to create a local user account.

8.19.1B THE COMPUTER MANAGEMENT SNAP-IN

The Computer Management snap-in (illustrated in the Figure below) is the tool used to create local user accounts.

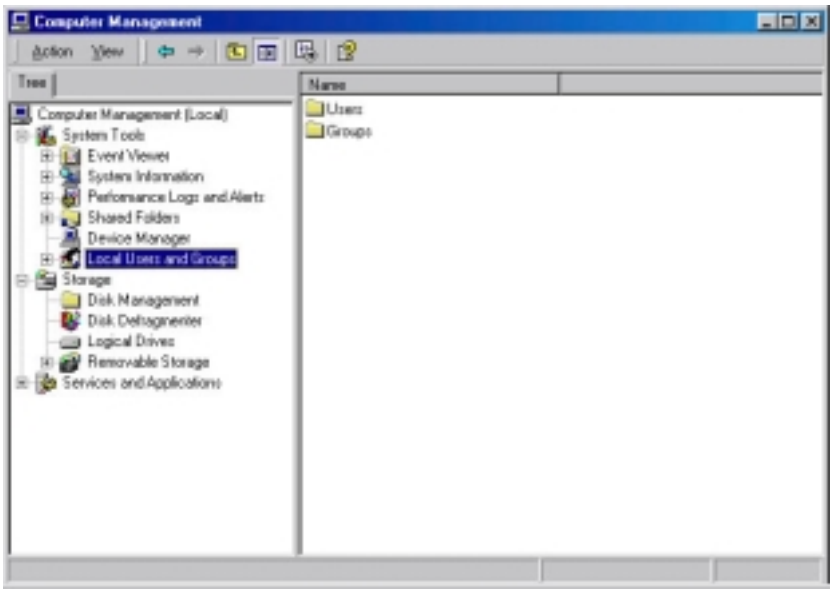


Figure 8-15B. The Computer Management Snap-in

You can create local user accounts by doing the following:

1. Click the Start button, point to Programs, point to Administrative Tools, and then click Computer Management.
2. In the Computer Management window, in the console pane, click Local Users And Groups.
3. In the details pane, right-click Users, and then click New User.
4. Fill in the appropriate fields in the New User dialog box, and then click Create.

The Table below describes the local user account options shown in the Figure below.

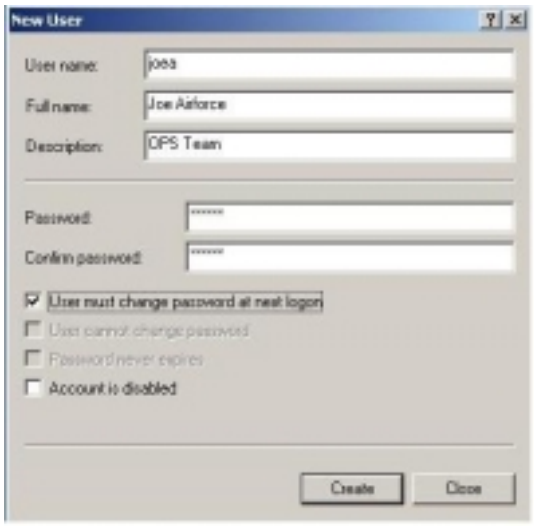


Figure 8-16B. The New User Dialog Box

Option	Description
User Name	The user's logon name. (Required)
Full Name	The user's full name, including the user's first and last names and may also include the middle name or initial.
Description	Field allowing you to type descriptive text about the user account or the user. (Optional)
Password	The password that is used to authenticate the user. For security purposes, *always* assign a password. The password is represented as asterisks when you type the password, regardless of the length of the password.
Confirm Password	Confirm the password by typing it a second time to make sure that you typed the password correctly. (Required if a password is assigned)
User Must Change Password At Next Logon	Selected by default, this check box forces the user to change their password the first time they log on. This ensures that the user is the only person who knows the password.
User Cannot Change Password	Select this check box if you have more than one person using the same user account (such as Guest) or to maintain control over user account passwords. This allows only administrators to control passwords. When the User Must Change Password At Next Logon check box is selected, the User Cannot Change Password check box isn't available.

Password Never Expires	Select this check box if you never want the password to change—for example, for a user account that will be used by a program or a Windows 2000 service. The User Must Change Password At Next Logon check box box overrides the Password Never Expires check box. When the User Must Change Password At Next Logon check box is selected, the Password Never Expires check box isn't available.
Account Is Disabled	Select this check box to prevent use of this user account—for example, for a new employee who hasn't started yet.

Table 8-6B. Local User Account Options

NOTE:

Always require new users to change their passwords the first time they log on. This will force them to use passwords that only they know.

TIP:

For added security on networks, create random initial passwords for all new user accounts by using a combination of letters and numbers. Creating random initial passwords helps create a more secure network.

8.19.2B IMPLEMENTING LOCAL GROUPS

In this lesson, we will explain what groups are and how they can be used to simplify user account administration.

- **After this lesson, you will be able to:**
  - Describe the key features of groups.
  - Describe local groups.
  - Create and delete local groups.
  - Add members to local groups.
  - Remove members from local groups.

8.19.2.1B UNDERSTANDING GROUPS

A *group* is simply a collection of user accounts. Groups simplify administration by permitting you to assign permissions and rights to a group of users rather than having to assign permissions to each individual user account.

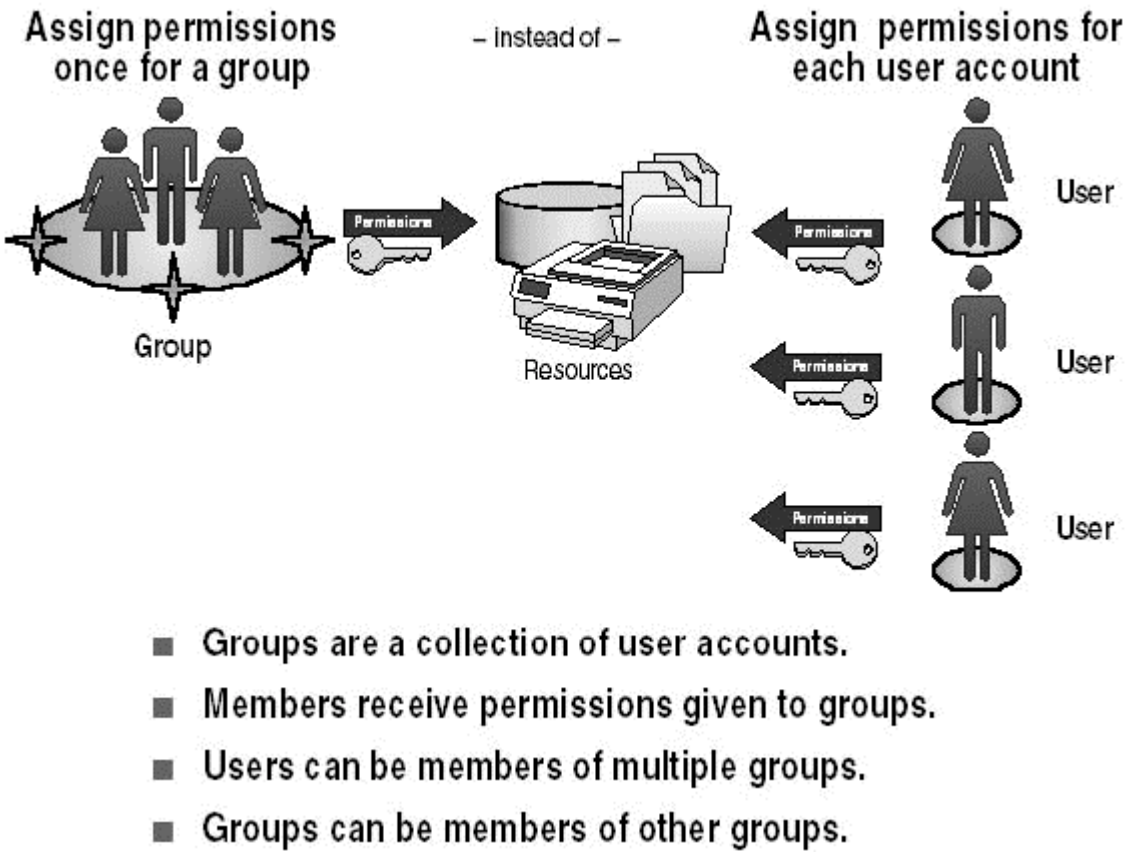


Figure 8-17B. Groups Simplify Administration

Permissions control what users can do with a resource, such as a folder, file, or printer. When assigning permissions, you give users the capability to gain access to a resource, and you define what type of specific access that they have. For example, if several users need to read the same file, you would add their user accounts to a group. Then you would give the group read permissions to the file. Rights allow users to perform system tasks, such as changing the time on a computer, backing up or restoring files, or logging on locally.

It is important to remember that users may be members of multiple groups. Each group contains a list of members, with references to the actual user account.

8.19.2.2B UNDERSTANDING LOCAL GROUPS

A local group is a collection of user accounts on a computer, created in the local security database. Local groups are used to assign permissions to resources located on the computer on which the local group is created.

8.19.2.3B PREPARING TO USE LOCAL GROUPS

The following are some guidelines for using local groups:

- Use local groups on computers that aren't members of a domain.

Local groups may only be used on the computer where you create the local groups. Although local groups are available on member servers and domain computers running Windows 2000 Professional, don't use local groups on computers that are part of a domain as this prevents you from centralizing user group and account management within the domain. Local groups don't appear in directory services based on Active Directory technology, and you must administer local groups separately for each computer.

- You can assign permissions to local groups for access to only the resources on the computer where you create the local groups.

  NOTE:

  You can't create local groups on domain controllers because domain controllers cannot have a security database that is independent of the database in Active Directory.

The following are membership rules regarding local groups:

- Local groups can contain local user accounts from the computer where you create the local groups.
- Local groups may not be members of any other group.

8.19.2.4B CREATING LOCAL GROUPS

The Computer Management snap-in is the tool used to create local groups, as shown in the Figure below. You create local groups in the Groups folder.

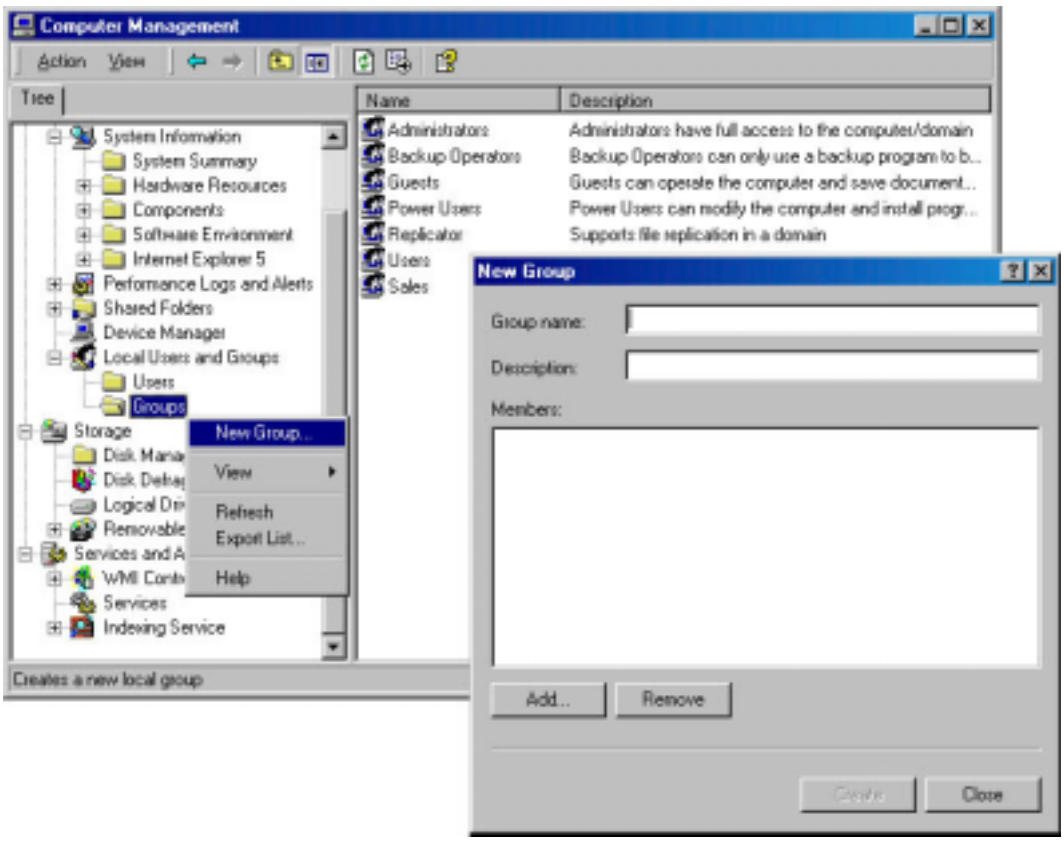


Figure 8-18B. The Computer Management Snap-in

You can create a local group by doing the following:

1. In Computer Management, expand Local Users And Groups and click the Groups folder.

2. Right-click Groups, and then click New Group.

   The Table below describes the options presented in the New Group dialog box. Enter the appropriate information and then click Create.

Option	Description
Group Name	(Required) A unique name for the local group. Use any character except for the backslash (\). The name may contain up to 256 characters; however, very long names will not display in some windows.
Description	A description of the group.
Add	Adds a user to the members list.
Remove	Removes a user from the members list.
Create	Creates the group.
Close	Closes the New Group dialog box.

Table 8-7B. New Local Group Options

You can add members to a local group when you create the group by using the Add button, but you can also add users to a local group after you create it.

8.19.2.5B DELETING LOCAL GROUPS

The Computer Management snap-in is also used to delete local groups. Each group that you create has a unique identifier. Windows 2000 uses this value to identify the group and the permissions that are assigned to it. When you delete a group, Windows 2000 doesn't use the identifier again, even if you create a new group with the same name as the group that you deleted. Therefore, you cannot restore access to resources by recreating the group.

Deleting a group only deletes the group and removes permissions and rights that are associated with it. Deleting a group doesn't delete the user accounts that are members of the group. To delete a group, right-click the group, and then click Delete.

8.19.2.6B ADDING MEMBERS TO A GROUP

If you wish to add members to a pre-existing group, start the Computer Management snap-in and expand Local Users And Groups. Click Groups, and then in the details pane, right-click the appropriate group and select Properties. In the Properties dialog box, click Add. The Select Users Or Groups dialog box appears, as shown in the Figure below.

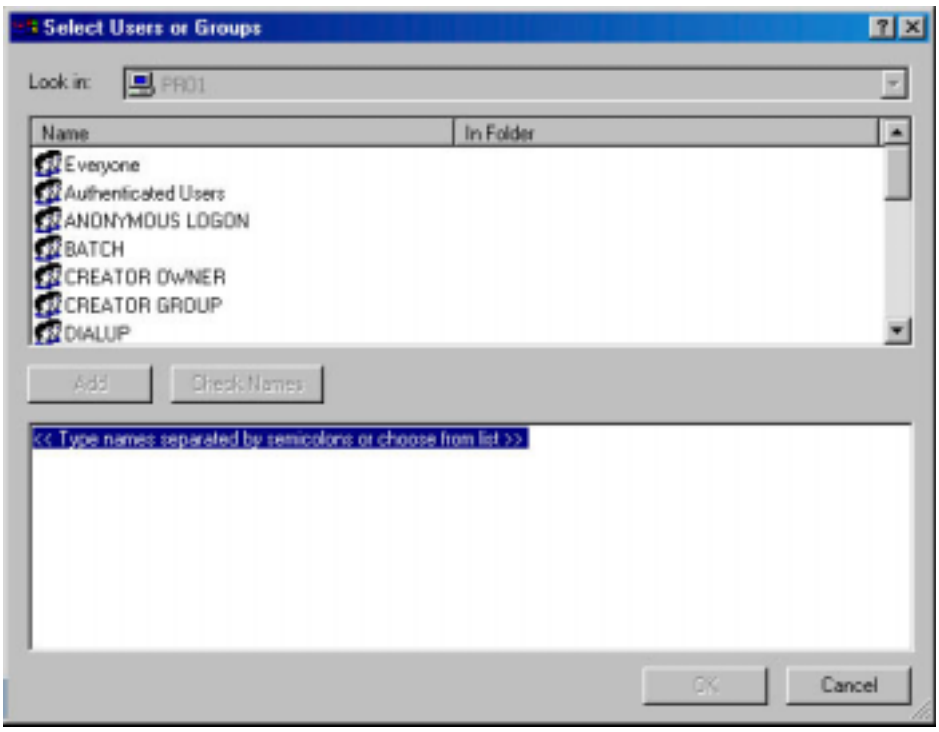


Figure 8-19B. Select Users or Groups Dialog Box

In the Look In list, make certain that the computer on which you created the group is selected. In the Name box, select the user account that you want to add to the group, and then click Add.

NOTE:

If you want to add multiple user accounts, you can repeat the process of selecting them one at a time and then click Add, or you can hold down the Shift or Ctrl key to select multiple user accounts at once. Click Add once you have selected all the accounts that you want to add.

Clicking Add lists the accounts you have selected. Review the accounts to make sure that they are the accounts you want to add to the group, then click OK to add the members.

NOTE:

User accounts may also be added to a group using the Member Of tab in the Properties dialog box for that user account. This is a quick method to add the same user account to multiple groups.

8.19.3B LESSON SUMMARY

In this lesson, you learned that a group is a collection of user accounts. Groups simplify administration by allowing you to assign permissions and rights to a group of users rather than having to assign permissions to each individual user account.

When naming a group, you make the name intuitive. You also learned that the Computer Management snap-in is the tool used to create groups, to add members to a group, to remove members from a group, and to delete groups.

8.20B IMPLEMENTING BUILT-IN LOCAL GROUPS

There are two categories of built-in groups used in Windows 2000: local and system. Built-in groups have a fixed set of user rights or group membership. Windows 2000 creates these groups for you so you don't have to create groups and assign rights and permissions for commonly used functions.

- **After this lesson, you will be able to describe the Microsoft Windows 2000 built-in groups.**

8.20.1B BUILT-IN LOCAL GROUPS

All stand-alone servers, member servers, and computers running Windows 2000 Professional have built-in local groups. *Built-in local groups* give rights to perform system tasks on a single computer, such as backing up and restoring files, changing the system time, and administering system resources.

The Table below describes the capabilities that the most commonly used built-in local groups have. There are no initial members of these groups, except as noted.

Local group	Description
Administrators	Members may perform all administrative tasks on the computer. By default, the built-in Administrator user account for the computer is a member. When a member server or a computer running Client for Microsoft Networks joins a domain the Domain Admins group is added to the local Administrators group.
Backup Operators	Members can use Windows Backup to back up and restore the computer.
Guests	Members can perform only tasks for which you have specifically granted rights and can gain access only to resources for which you have assigned permissions; members can't make permanent changes to their desktop environment. By default, the built-in Guest account for the computer is a member. When a member server or a computer running Client for Microsoft Networks joins a domain, Windows 2000 adds the Domain Guests group to the local Guests group.
Power Users	Members can create and modify local user accounts on the computer and share resources.
Replicator	Supports file replication in a domain.
Users	Members can perform only tasks for which you have specifically granted rights and can gain access only to resources for which you have assigned permissions. By default, local user accounts that you create on the computer are members of the Users group. When a member server or a computer running Windows 2000 Professional joins a domain, Windows 2000 adds the Domain Users group to the local Users group.

Table 8-8B. Built-In Local Groups

8.20.2B BUILT-IN SYSTEM GROUPS

Built-in system groups exist on all computers running Windows 2000. *System groups* don't have specific memberships that you can modify, but they can represent different users at different times, depending on how a user gains access to a computer or resource. You don't see system groups when you administer groups, but they are available for use when you assign rights and permissions to resources. Windows 2000 bases system group membership on how the computer is accessed, not on who uses the computer. The Table below describes the most commonly used built-in system groups.

System Group	Description
Everyone	Includes all users who access the computer. Be careful if you assign permissions to the Everyone group and enable the Guest account. Windows 2000 will authenticate a user who does not have a valid user account as Guest. The user automatically gets all rights and permissions that you have assigned to the Everyone group.
Authenticated Users	Includes all users with a valid user account on the computer (or if your computer is part of a domain, it includes all users in Active Directory directory services). Use the Authenticated Users group instead of the Everyone group to prevent anonymous access to a resource.
Creator Owner	Includes the user account for the user who created or took ownership of a resource. If a member of the Administrators group creates a resource, the Administrators group is owner of the resource.
Network	Includes any user with a current connection from another computer on the network to a shared resource on the computer.
Interactive	Includes the user account for the user who is logged on at the computer. Members of the Interactive group gain access to resources on the computer at which they are physically located. They log on and gain access to resources by "interacting" with the computer.
Anonymous Logon	Includes any user account that Windows 2000 didn't authenticate.
Dialup	Includes any user who currently has a dial-up connection.

Table 8-9B. Commonly Used Built-In System Groups

8.20.3B LESSON SUMMARY

In this lesson, you learned that Windows 2000 has two categories of built-in groups: local and system. You also learned that built-in groups have a pre-established set of user rights or group membership. Windows 2000 creates these groups so you don't have to create groups and assign rights and permissions for the most commonly used functions.

8.21B WINDOWS 2000 PRINTING

With Windows 2000 printing, printing resources may be shared across an entire network and administered from a central location. Printing is easily setup on client computers running a Windows operating system.

- **After this lesson, you will be able to:**

o Define Microsoft Windows 2000 printing terms.

o Identify the requirements for setting up a network printer and network printing resources.

o Add and share a new printer for a local print device or a network-interface print device.

o Set up client computers.

o Make a connection to a network printer using the Add Printer Wizard or a Web browser.

o Share an existing printer.

o Create a printer pool.

o Set priorities between printers.

8.21.1B TERMINOLOGY

You should become familiar with Windows 2000 printing terminology to understand how the different components fit together, as shown in the Figure below.

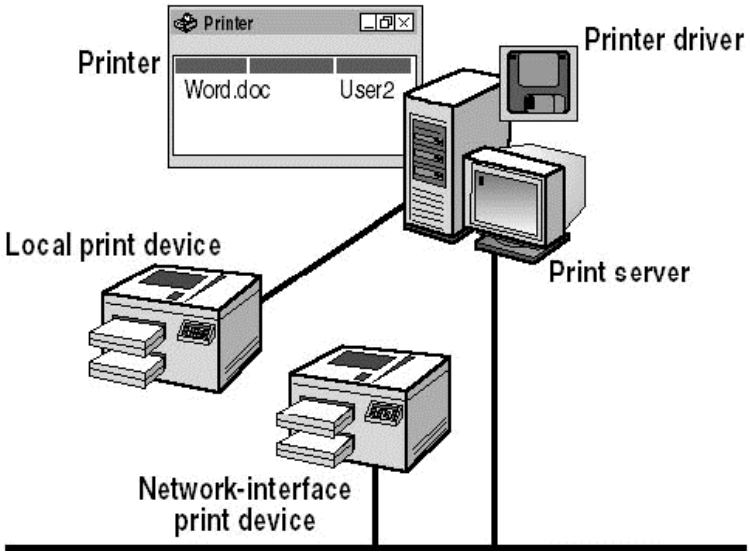


Figure 8-20B. Printing Terminology

If you are new to Windows 2000, some of the printing terminology may be different from what you expect. A few Windows 2000 printing terms are:

- **Printer.** A *printer* is the software interface between the operating system and the print device. The printer defines where a document will go to reach the print device (i.e. to a local port, a port for a network connection, or a file), when it will go, and how other aspects of the printing process will be handled. Connections are made to printers using printer names, which point to one or more print devices.

- **Print device.** A *print device* is the hardware device that produces printed documents.

  Windows 2000 provides support for two types of print devices:

  - *Local print devices,* which are connected to a physical port on the print server.

  - *Network-interface print devices,* which are connected to a print server through the network instead of a physical port. Network-interface print devices require their own network interface cards and have their own network address, or they are attached to an external network adapter.

- **Printer port.** A *printer port* is the software interface through which a computer communicates with a print device by means of a locally attached interface.

  Windows 2000 supports these interfaces: line printer (LPT), COM, USB, and network-attached devices such as the HP JetDirect and Intel NetPort.

- **Print server.** A *print server* is the computer system on which the printers that are associated with local and network-interface print devices reside. The print server receives and processes documents from client computers. Network printers are setup on and shared from the print server.

- **Print queue.** A *print queue* is an area of memory set aside on the print server for documents waiting to be printed when the print server can't immediately print the request.

- **Printer driver.** A *printer driver* is one or more files containing information that Windows 2000 uses to translate print commands into a specific printer language, such as PostScript. This conversion enables a print device to print a document. A printer driver is specific to each print device model.

8.21.2B REQUIREMENTS FOR NETWORK PRINTING

The following is a list of requirements for setting up printing on a Windows 2000 network:

- At least one computer must operate as the print server. If the print server will manage many heavily used printers, Microsoft recommends a dedicated print server. The computer may run either of the following:

  - Windows 2000 Server, which can handle a large number of connections and supports Macintosh and UNIX computers and NetWare clients.

  - Windows 2000 Professional, which is limited to 10 concurrent connections from other computers for file and print services and doesn't support Macintosh computers or NetWare clients.

- Sufficient RAM to process documents. If a print server manages a large number of printers or many large documents, the server will likely need additional RAM beyond what Windows 2000 requires for other tasks, or else printing performance deteriorates.

- Sufficient disk space on the print server to ensure that Windows 2000 can spool (store) documents that are sent to the print server until the documents are sent to the print device. This is critical when documents are large or likely to accumulate. For example, if 10 users attempt to print large documents at the same time, the print server must have enough disk space to hold all of the documents until they are sent to the print device. The users will get error messages and will not be able to print if there isn't enough space to hold all of the documents.

8.21.2.1B GUIDELINES FOR A NETWORK PRINTING ENVIRONMENT

Before configuring network printing, you need to establish a network-wide printing policy that will meet users' printing needs without unnecessary duplication of resources or delays in printing. The Table below illustrates some strategies for developing a network printing policy.

Guideline	Explanation
Determine user's printing requirements	Determine the number of users who print and the printing workload. For example, 10 people in a publishing department who print documents continually will have a larger printing workload and may need more printers, print devices, and possibly, more print servers than 10 customer service reps who do all their work online.
Determine company's printing requirements	Determine the printing needs of your company, including the number and types of print devices that are required. Also, consider the type of workload that each print device must handle. Never use a personal print device for network printing.
Determine the number of print servers required	Using the above factors, determine the number of print servers that your network requires to manage the number and types of printers that your network will have.
Determine where to locate print devices	Decide where to put the print devices so that users can easily pick up their printed documents.

Table 8-10B. Network Printing Environment Guidelines

8.21.2.2B CONFIGURING NETWORK PRINTERS

Network printers are configured and shared to allow multiple users to print to them. You may set up a printer for a local print device attached directly to the print server, or you may set up a printer for a

network-interface print device that connects to the print server via the network. In larger organizations, most printers are linked to network-interface print devices.

8.21.3B LOCAL PRINT DEVICES

The steps for adding a printer, whether it is a local print device or a network-interface print device, are similar. A printer for a local print device may be added as follows:

1. Log on as Administrator on the print server.

2. Click Start, point to Settings, and then click Printers. Printers are added and shared using the Add Printer wizard in the Printers folder.

3. Double-click Add Printer to launch the Add Printer wizard. The Add Printer wizard starts by displaying the Welcome To The Add Printer Wizard page.

4. Click Next and the Add Printer wizard displays the Local Or Network Printer page. The Add Printer wizard walks you through the steps necessary to add a printer for a print device that is connected to the print server. The number of local print devices that you can physically connect to a print server is dependent on your hardware configuration.

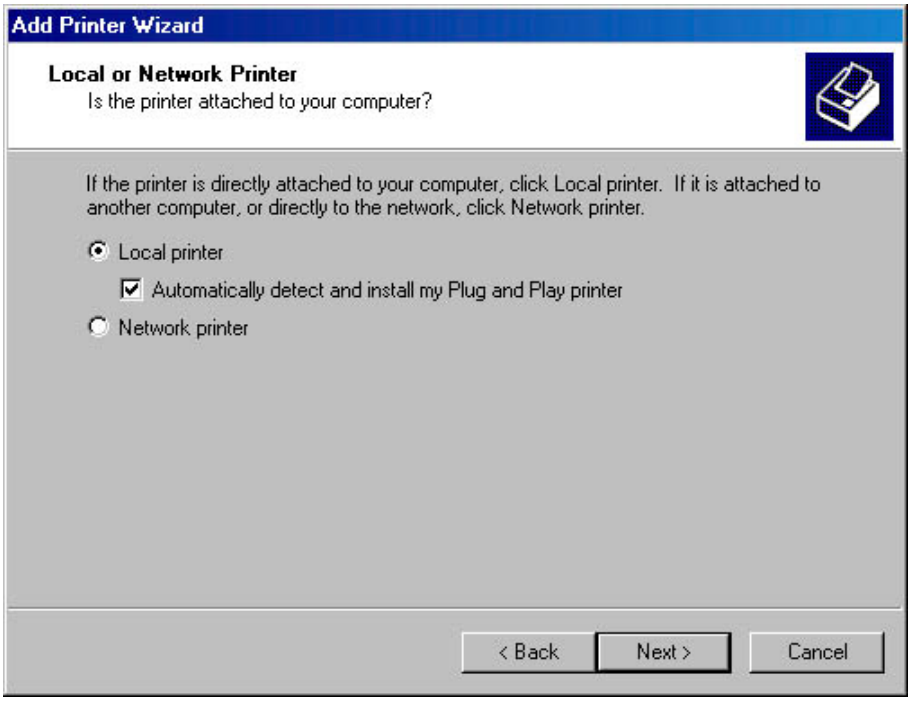


Figure 8-21B. Local Or Network Printer Page

The Table below describes the Add Printer wizard options for adding a printer for a local print device.

Option	Description

Local Printer	The designation that you are adding a printer to the computer at which you are sitting, which is the print server. The Automatically Detect And Install My Plug And Play Printer check box allows you to specify whether you want Windows 2000 to automatically detect and install a Plug and Play printer.
Use The Following Port	The port on the print server to which you attached the print device. You can also create a new port. Creating a port allows you to print to nonstandard hardware ports, such as a network-interface connection.
Manufacturers	Select the manufacturer of your printing device and the correct printer driver for it.
Printers	Select the printer model for your print device. If your print device isn't in the list, provide a printer driver from the manufacturer or select a model that is similar enough that the print device can use it.
Printer Name	A name that will identify the printer on the network. This name should be both intuitive and descriptive of the print device. Some applications might not support more than 31 characters in the server and printer name combinations. If your computer is part of a domain, this name also appears in the result of an Active Directory search.
Default Printer	The used by all Windows applications as the default. Select the Yes option button for the Do You Want Your Windows-Based Programs To Use This Printer As The Default Printer? option so that users aren't required to select a printer to use as default. The first a printer is added to the print server, this option will not appear because the printer is automatically chosen to be the default printer.
Share As	A share name that users (with the appropriate permission) can use to make a connection to the printer over the network. This name appears when users browse for a printer as well as when they supply a path to a printer. Ensure that the share name is compatible with the naming conventions for all client computers on the network. By default, the share name is the printer name truncated to an 8.3 character filename. If you choose a share name longer than an 8.3 character filename, some client computers may not be able to connect.
Location	Information regarding the print device's location. Provide information that helps users decide if the print device fits their needs.
Comment	Users can search the Active Directory for the information listed here or in the Location box. Because of this search capability, you should standardize the type of information that you enter so that users can compare printers in search results.

Do You Want To Print A Test Page?	Verification that you have installed the printer correctly. Select the Yes option button to print a test page.

Table 8-11B. Add Printer Wizard Options for a Local Print Device

8.21.4B NETWORK-INTERFACE PRINT DEVICES

Most print devices are network-interface print devices in larger organizations. These print devices offer several advantages over local print devices in that print devices don't need to be located with the print server and network connections transfer data more quickly than printer cable connections.

Printers are added for network-interface print devices by using the Add Printer wizard. The main differences between adding a printer for a local print device and adding a printer for a network-interface print device is that for a typical network-interface print device, additional information such as port and network protocol information is required.

The default network protocol for Windows 2000 is TCP/IP. For TCP/IP, you provide additional port information in the Add Standard TCP/IP Printer Port wizard.

The Figure below shows the Select The Printer Port page of the Add Printer wizard, and the Table describes the choices listed on the Select The Printer Port page as they pertain to adding a network-interface print device.

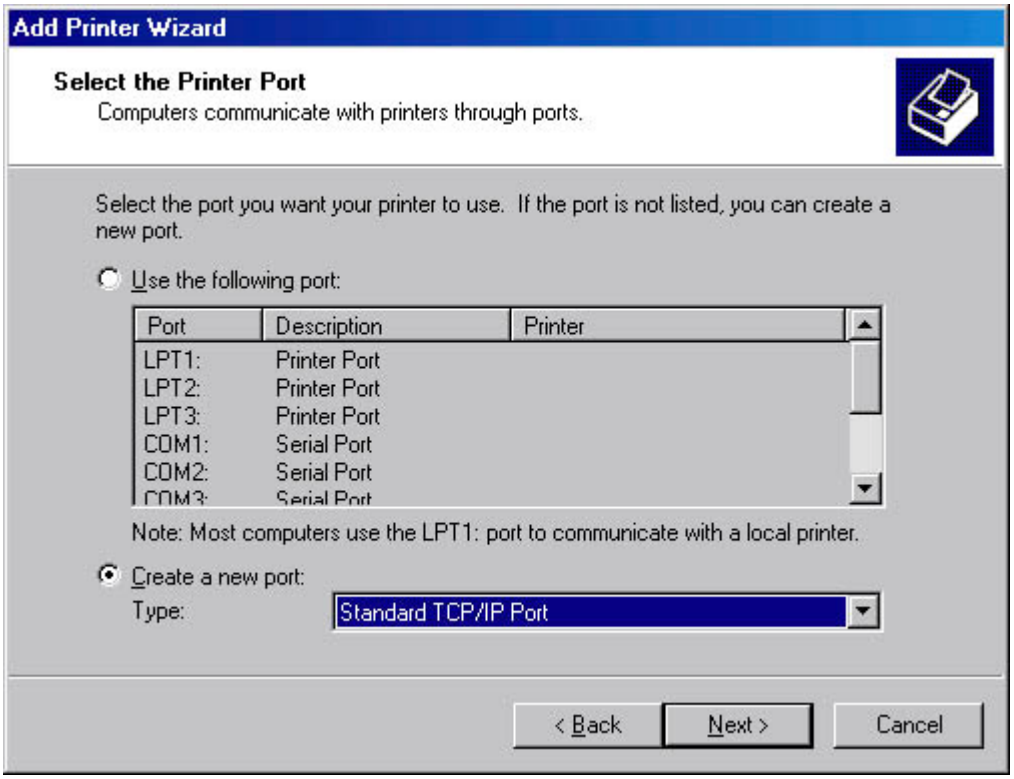


Figure 8-22B. Select The Printer Port Page of the Add Printer Wizard

Option	Description
Create A New Port	Use this option to begin creating a new port for the print server to which the network-interface print device is connected. In this case, the new port points to the network connection of the print device.
Type	This choice establishes the network protocol to use for the connection. If you select Standard TCP/IP Port, it will start the Add Standard TCP/IP Printer Port wizard.

Table 8-12B. Select The Printer Port Page Options That Affect Adding a Network-Interface Print Device

The Figure below illustrates the Add Port page of the Add Standard TCP/IP Printer Port wizard, and the Table describes the choices on the Add Port page of the Add Standard TCP/IP Printer Port wizard.

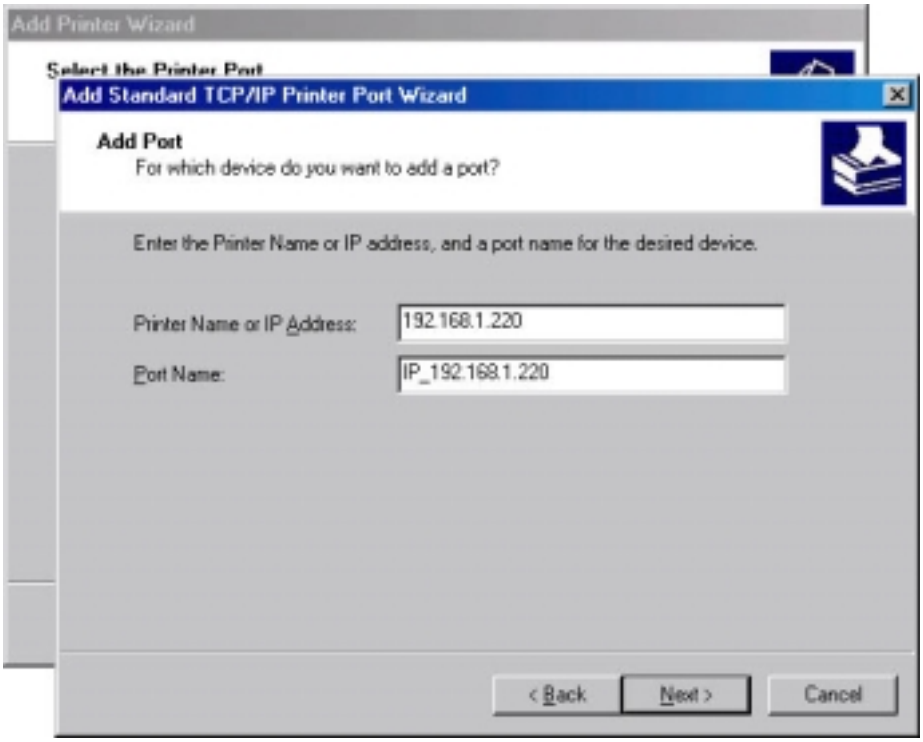


Figure 8-23B. Add Port Page of the Add Standard TCP/IP Printer Port Wizard

Option	Description
Printer Name Or IP Address	The IP address or DNS name of the network-interface print device. If you supply an IP address, Windows 2000 automatically offers a suggested port name for the print device in the form IP_*IPaddress*. Additional details are needed if Windows 2000 can't connect to and identify the network-interface print device. To enable automatic identification, make sure that the print device is powered on and connected to the network.
Port Name	The name Windows 2000 suggests for the port that you created and defined. You can enter a different name. After you create the port, it is displayed on the Select The Printer Port page of the Add Printer wizard. The port doesn't have to be redefined if you point additional printers to the same print device.

Table 8-13B. Select The Printer Port Page Options that Affect Adding a Network-Interface Print Device

NOTE:

If you wish to use a protocol other than TCP/IP for your print device, you must install the network protocol before you can add a printer for the device. After installing the protocol, you can add additional ports that use the protocol. The tasks and setup information that are required to configure a printer port depend on the network protocol being used.

8.21.5B CONFIGURING CLIENT COMPUTERS

After you installing and sharing a printer, client computers must be configured to enable users to print. Although the tasks to configure client systems vary depending on which operating systems they are using, all client computers require that a printer driver be installed.

The following details the installation of printer drivers according to the computer's operating system:

- Windows 2000 automatically downloads the printer drivers for client computers running Windows 2000, Windows NT version 4 and earlier, Windows 98, or Windows 95.
- Client computers running other Microsoft operating systems require installation of printer drivers.
- Client computers running non-Microsoft operating systems require installation of both printer drivers and the print service on the print server.

8.21.6B CLIENT SYSTEMS RUNNING WINDOWS 2000, NT, 98, OR 95

Client computers using Windows 2000, Windows NT, Windows 98, and Windows 95 need to make a connection only to the shared printer. If a copy of the appropriate printer driver resides on the print server, the client computer automatically downloads it.

To make a connection to a shared printer from a client running Windows 2000, start the Add Printer wizard. On the Local Or Network Printer page, select Network Printer, and then click Next. The Locate Your Printer page appears as shown in the figure below.

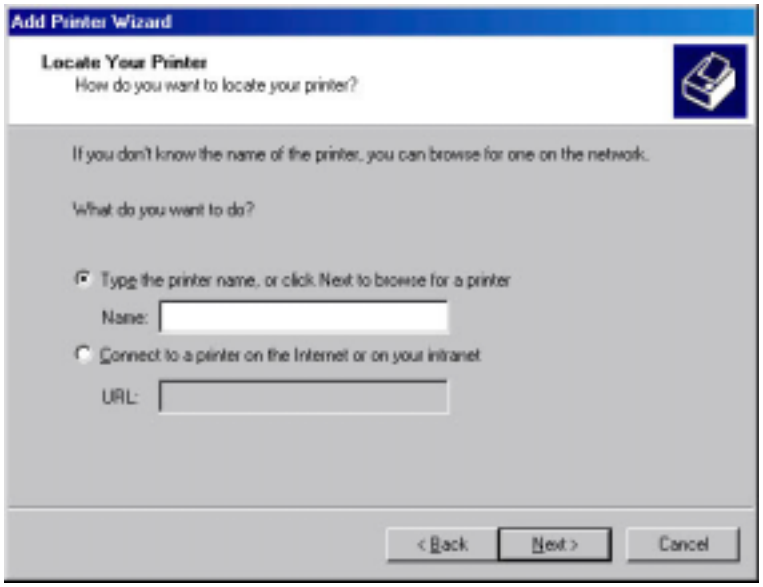


Figure 8-24B. Locate Your Printer Page

If you don't know the name for the shared printer, you can browse for it by leaving the Name box blank and clicking Next. The Browse For Printer page appears as in the Figure below.

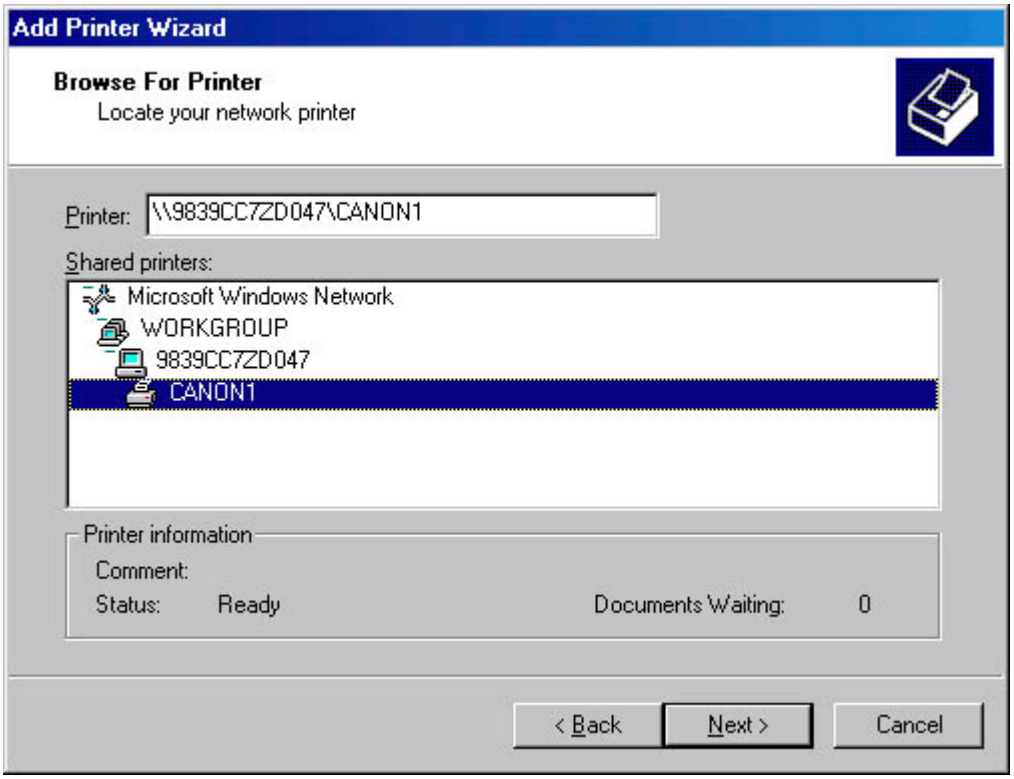


Figure 8-25B. Browse for Printer Page

Locate the shared printer and select it, then click Next and you will be asked if it should be set as the default printer. If you want it to be the default printer, click Yes; otherwise, click No and then click Next. The Completing The Add Printer Wizard page is displayed. Verify the information and then click Finish. You have successfully made a connection from your client computer to the shared printer.

8.21.6.1B CLIENT COMPUTERS RUNNING OTHER MICROSOFT OPERATING SYSTEMS

To enable client computers running other Microsoft operating systems (such as Windows 3.*x* or MS-DOS) to print to a shared Windows 2000-based printer, the driver must be manually installed on the client computer. The appropriate printer driver for a Windows-based client computer should be located on the installation disks for that client computer or on the manufacturer's driver disk for the printer.

8.21.6.2B CLIENT COMPUTERS RUNNING NON-MICROSOFT OPERATING SYSTEMS

To enable printing from non-Microsoft operating systems, the print server must have additional services installed on it. The Table below shows the services required for Macintosh, UNIX, and NetWare clients to print.

Client Computer	Required Services
Macintosh	Services for Macintosh are included only with Windows 2000 Server, not Windows 2000 Professional.
UNIX	TCP/IP Printing, which is also called Line Printer Daemon (LPD) Service, is included with Windows 2000 Server but is not installed by default.
NetWare	File and Print Services for NetWare (FPNW), an optional add-on service for Windows 2000 Server, isn't included with Windows 2000 Server or Windows 2000 Professional.

Table 8-14B. Services Required for Client Computers Running Non-Microsoft Operating Systems

8.21.7B CONNECTING TO NETWORK PRINTERS

By default all users can make a connection to a shared printer and print documents. The method that is used to connect to a printer is dependent on the client computer. Client computers running Windows 2000, Windows NT, Windows 98, or Windows 95 may use the Add Printer Wizard, although the Add Printer Wizard in Windows 2000 has more robust features than that of earlier operating systems. If the client computer is running Windows 2000, however, it may also connect to the printer via a Web browser.

8.21.7.1B USING THE ADD PRINTER WIZARD

The Add Printer Wizard is one method that client computers running Windows 2000, Windows NT, Windows 98, or Windows 95 can use to connect to a printer. This is the same wizard that you use to add and share a printer. The Add Printer Wizard options that allow you to locate and connect to a printer vary depending on which operating system is running on the client computer. This is illustrated in the Figure below.

8.21.7.2B WINDOWS 2000 CLIENTS

Connections to printers from Windows 2000 clients using the Add Printer Wizard are made using several methods:

- **Use the UNC name.**

  You can use the UNC name (*print_server**printer_name*) to make connections by selecting Type The Printer Name Or Click Next To Browse For A Printer on the Locate Your Printer page of the Add Printer Wizard. If you know the UNC name, this is a fast method to use.

- **Browse the network.**

  You may also browse the network for the printer by selecting Type The Printer Name Or Click Next To Browse For A Printer on the Locate Your Printer page of the Add Printer Wizard, leaving the Name box blank, and clicking Next.

- **Use the URL name.**

You may also connect to a printer on your intranet or on the Internet by choosing Connect To A Printer On The Internet Or On Your Intranet on the Locate Your Printer page of the Add Printer Wizard.

- **Search Active Directory.**

  If your Windows 2000 client is a member of a domain, you can find the printer by using Active Directory's search capabilities. You can search either the entire Directory or just part of it. You can further narrow the search by detailing features of the printer, such as color printing.

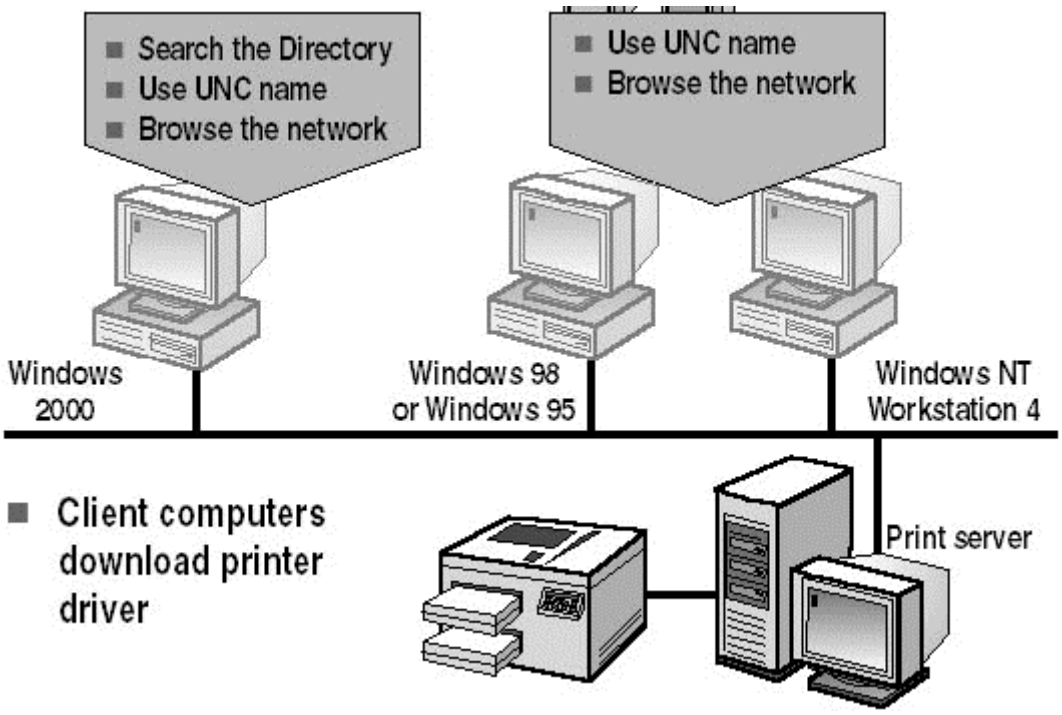


Figure 8-26B. Using the Add Printer Wizard to Locate and Connect to a Network Printer
WINDOWS NT 4, WINDOWS 98, or WINDOWS 95 Clients

Windows NT 4, Windows 98, or Windows 95 clients are more limited, in that the Add Printer Wizard allows you only to enter a UNC name or to browse Network Neighborhood to locate the printer.

NOTE:

You can also make a connection to a printer by using the Run command on the Start menu. To make this type of connection, type the UNC name of the printer in the Open box, and click OK.

8.21.7.3B OTHER MICROSOFT OPERATING SYSTEM CLIENTS

Print Manager is used on Windows 3.*x* and Windows for Workgroups clients instead of the Add Printer Wizard to make a connection to a printer.

Users at any Windows-based client computer can make a connection to a network printer by using the following command:

```
net use lptx: \\server_name\share_name
```

Where *x* is the number of the printer port.

The Net Use command is the only method that MS-DOS or OS/2 clients with Microsoft LAN Manager client software installed can use to connect to a network printer.

8.21.7.4B CONNECTING VIA A WEB BROWSER

A Windows 2000 client can make a connection to a printer through a corporate intranet. You simply type a URL in your Web browser, and you don't have to use the Add Printer Wizard. Windows 2000 will automatically install the proper printer drivers on the client after a connection is made.

This web page can be customized by a web developer, such as perhaps displaying a floor plan showing the location of print devices for users to choose from. There are two ways to connect to a printer via a Web browser:

- http://*server_name*/printers

  This Web page lists all shared printers on that print server that you have permission to use. Here you will find details about the printers, including the printer name, status of print jobs, location, model, and any comments that were entered when the printer was installed. This information can be used to help you select the printer that matches your needs.

- http://server_name/printer_share_name

  This method requires you to type the exact intranet path for a specific printer, and you must have permissions to use the printer.

8.21.7.5B DOWNLOADING PRINTER DRIVERS

When Windows 2000, Windows NT, Windows 98, or Windows 95 clients first connect to a printer on the print server, they automatically download the printer driver if a copy of the driver is on the print server.

Thereafter, Windows 2000 and Windows NT clients will verify that they have the current printer driver each time that they print. If not, they download the new printer driver. These clients allow centralized management of printer drivers, because the newest updated drivers only need be installed on the server, and they will propagate through your network. Windows 98 or Windows 95 clients will not check for updated printer drivers, so they must be manually updated.

8.21.7.6B CONFIGURING NETWORK PRINT SETTINGS

After you have set up and shared network printers, you may need to configure various printer settings so that the printing resources and user needs better match.

The three common configuration changes you will make are:

- You may share an existing printer that isn’t shared if your printing load increases.

- You may create a printer pool, enabling the printer to automatically distribute print jobs to the first available print device, which means that users don't have to search for an available printer.
- You can set priorities between printers so that high priority documents always print before routine documents.

8.21.7.7B SHARING EXISTING PRINTERS

If the printing demands on your network increase, and your network has existing printers that are not shared for a print device, you may choose to share them to lighten the printing burden.

When you share a printer:

- You assign the printer a share name that will appear in My Network Places. The name should be intuitive and descriptive, to make it easier for users to choose the printer
- You may want to add drivers for all versions of Windows NT, Windows 95, Windows 98, and Windows 2000.

The Sharing tab, in the Properties dialog box for the printer, is used to share an existing printer (as illustrated in the Figure below).

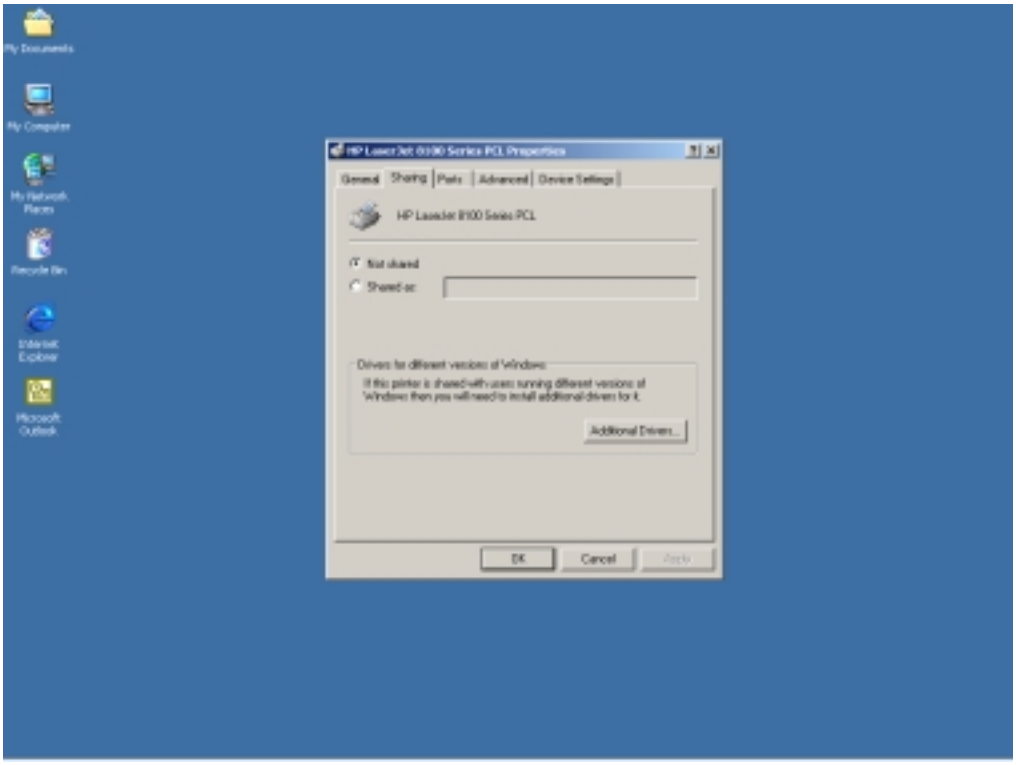


Figure 8-27B. Sharing Tab in the Properties Dialog Box for a Printer

You access the Sharing tab in a printer's Properties as follows:

1. In the Printers folder, click the icon for the printer that you want to share.

2. On the File menu, click Properties.

3. In the Properties dialog box for the printer, click the Sharing tab.

Windows 2000 puts an open hand under the printer icon to indicate that a printer is shared.

8.21.7.8B SETTING UP A PRINTER POOL

A *printer pool* is one printer that is connected to multiple print devices through multiple ports on a print server. The print devices can be local or network-interface print devices, but must all share the same print driver. Typically, these print devices will be identical.

Using a printer pool, users can print even if one of the printers are offline or the port is busy.

NOTE:

Print devices in a printer pool should all be in the same location to that users know where to go to collect their documents.

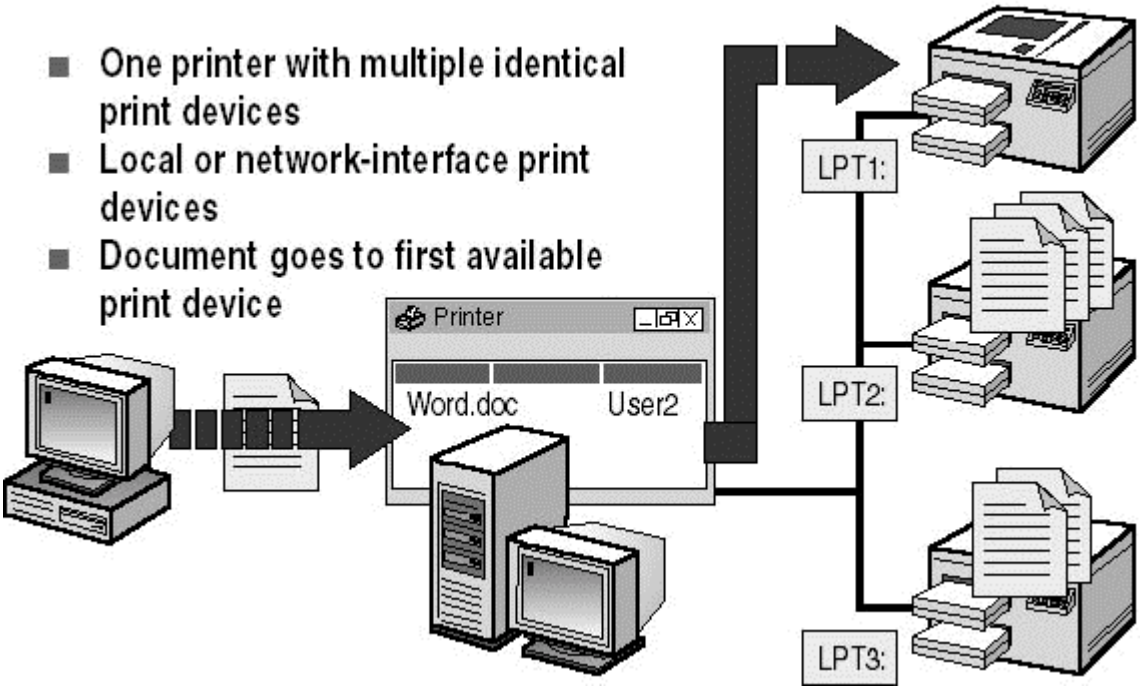


Figure 8-28B. A Printer Pool

Advantages to having a printer pool:

- In a network with a high volume of printing, it decreases the time that documents wait on the print server.
- It simplifies administration because you can administer multiple print devices from a single printer.

Before you create a printer pool, make sure that you connect the print devices to the print server.

To create a printer pool:

1. In the Properties dialog box for the printer, click the Ports tab.
2. Select the Enable Printer Pooling check box.
3. Select the check box for each port to which a print device that you want to add to the pool is connected, and then click OK.

8.21.7.9B SETTING PRIORITIES BETWEEN PRINTERS

You may set priorities between groups of documents that all print on the same print device. Multiple printers point to the same print device, which allows users to send urgent documents to a high-priority printer and routine documents to a lower-priority printer. The critical documents always print first. Consider the following two methods to set priorities between printers:

- Point two or more printers to the same print device—that is, the same port. The port can be either a physical port on the print server or a port that points to a network-interface print device.
- Set a different priority for each printer that is connected to the print device, and then have different groups of users print to different printers, or have users send different types of documents to different printers.

  For an example, look at the Figure below. User1 sends documents to a printer with the lowest priority of 1, while User2 sends documents to a printer with the highest priority of 99. In this example, User2's documents always print before User1's.

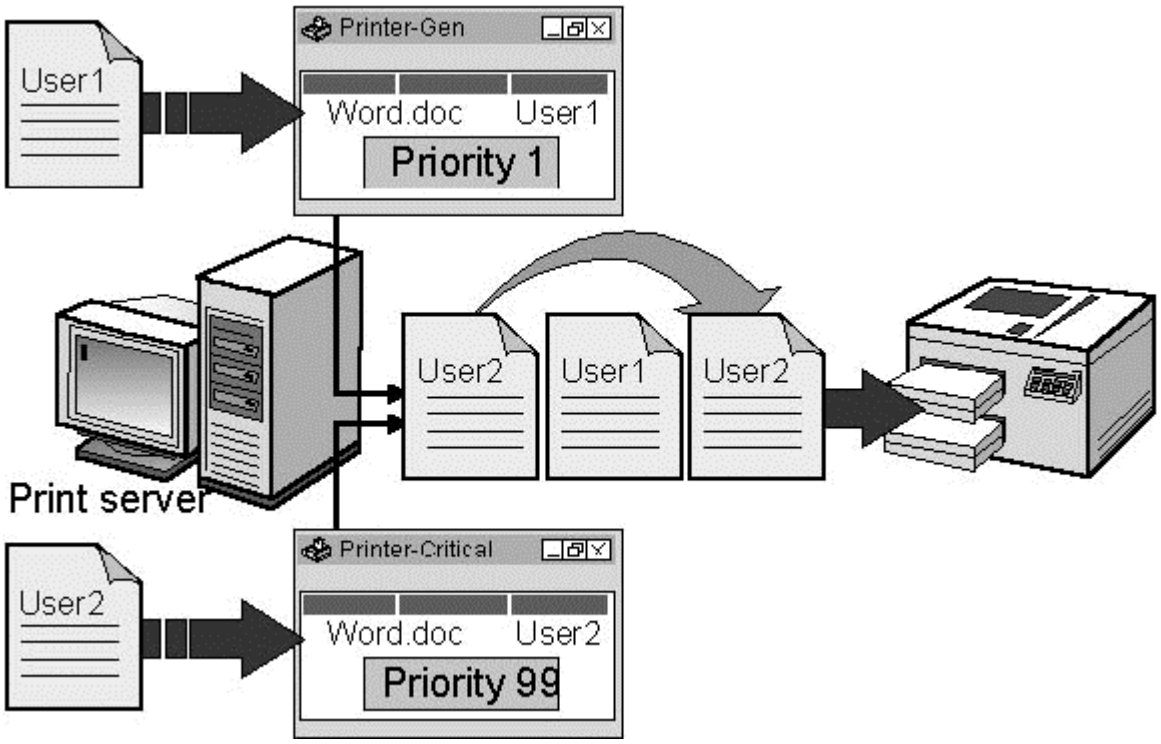


Figure 8-19B. A Printer Pool With Different Priorities Set

The following describes how to set a printer's priority:

1. In the Properties dialog box for the printer, click the Advanced tab.

2. In the Priority box, select the appropriate priority, and then click OK. Windows 2000 sets the priority for the printer.

8.21.8B LESSON SUMMARY

In this lesson, you learned various aspects of Windows 2000 printing terminology. A printer is software interfaces with the print device, and the print device is the actual hardware device that produces printed documents. Windows 2000 supports local print devices, which are physically attached to the print server, and network-interface print devices, which are connected to a print server through the network.

You also learned that a print server is a computer running either Windows 2000 Professional or Windows 2000 Server on which the printers reside. The print server receives and processes documents from client computers. Network printers are setup and shared on print servers. A printer driver is one or more files containing information that Windows 2000 requires to translate print commands into a specific printer language, such as PostScript. This translation enables a print device to print a document, and is specific to each print device model.

Additionally, you learned that setting up printing on a Windows 2000 network requires at least one computer to operate as the print server. If the print server will manage many heavily used printers, Microsoft recommends that you use a dedicated print server. A print server running Windows 2000 Professional is limited to 10 concurrent connections for file and print services, and doesn't support Macintosh or NetWare clients but does support UNIX systems.

You learned that the Add Printer Wizard is the tool used to set up and share a printer for a local print device or for a network-interface print device. Sharing a local printer makes it possible for multiple users on the network to print to it.

You also learned that Windows 2000, Windows NT, Windows 98, or Windows 95 clients need to make a connection only to the shared printer to be able to print. The client computer automatically downloads the appropriate printer driver, as long as a copy of it exists on the print server. For client computers running other Microsoft operating systems (such as Windows 3.*x* or MS-DOS) to print to a shared Windows 2000-based printer, you must manually install a printer driver on the client computer. The appropriate printer driver for a Windows-based client computer is located on the installation disks for that client computer or from the printer manufacturer. To enable non-Microsoft clients to print, the print server must have additional services installed on it.

You learned that Windows 2000, Windows NT, Windows 98, or Windows 95 clients can use the Add Printer Wizard to connect to a printer. Additionally, on Windows 2000 clients, you may connect to a printer by using Active Directory's search capabilities, or you can select Connect To The Printer Using A Network Name on the Locate Your Printers page of the Add Printer Wizard. If you know the UNC name, you can use it, or you can browse the network for the printer.

On Windows NT 4, Windows 98, or Windows 95 clients, the Add Printer Wizard only allows you to enter a UNC name or to browse Network Neighborhood to locate the printer. Windows 3.*x* and Windows for Workgroups clients must use Print Manager to make a connection to a printer.

You also learned that users at any Windows-based client computer can make a connection to a network printer by using the Net Use command. The Net Use command is also the only method that is available

for making a connection to a network printer from client computers running MS-DOS or OS/2 with Microsoft LAN Manager client software installed.

You learned to use the Sharing tab in the Properties dialog box for the printer and select Shared As to share a printer. Windows 2000 puts an open hand under the printer icon, to indicate that a printer is shared.

You also learned that a printer pool is one printer that is connected to multiple print devices through multiple ports on a print server. The print devices in a printer pool should be identical; however, you can use print devices that aren't identical as long as all the print devices use the same printer driver. A printer pool can decrease the time that documents wait on the print server, simplify administration by allowing administration of multiple print devices from a single printer. To create a printer pool, in the Properties dialog box for the printer, use the Ports tab to select the Enable Printer Pooling check box.

Setting priorities between printers makes allows you to set priorities between groups of documents that all print on the same print device. Multiple printers point to the same print device, allowing users to send critical documents to a high-priority printer and routine documents to a lower-priority printer. In this scenario, the critical documents will always print first.

8.22B RESOURCES

The following reference materials are publications from Microsoft Press: Inside Windows 2000, Microsoft Professional Research Kit, Microsoft Professional Step-by-Step, Microsoft Professional Expert Companion, Running Microsoft 2000 Professional, and Troubleshooting Microsoft 2000 Professional. Also, you can review the Microsoft web site for other reference publications.

8.23B SUMMARY

Module 8B was a lesson on the installation of Windows 2000 Professional. Students identified hardware requirements and the required information needed to successfully install Windows 2000 Professional. Students installed Windows 2000 Professional using the CD-ROM. After installing the program, students now should be able to describe the function and components of the Microsoft Management Console, including snap-ins, console options and modes. Highlight the managing hardware profiles and use the control panel to configure the display. Students should be able to accomplish disk management tasks and be able to describe the role and purpose of user accounts. Understand how to create local user accounts, describe the key features of groups, as well as describing local groups. In addition of describing groups and local groups, students created and deleted local groups, added members to local groups, and removed users from local groups. Students will also be able to describe the Microsoft Windows 2000 built-in groups. Students were introduced to Microsoft Windows 2000 printing terms and requirements for setting up a network printer and network printing resources. Also, the adding and sharing a new printer for a local print device or a network-interface print device. Students will be able to set up client computers enabling users to make connections to a network printer using the Add Printer Wizard or a Web browser. Finally, students will be able to sharing existing printers, create a printer pool and set priorities between printers.

8.24B REVIEW QUESTIONS

1. Name the pre-installation tasks that should be completed prior to installing Windows 2000?

2. Identify the system requirements prior to installing Windows 2000?

3. When installing Windows 2000 from a CD-ROM to a clean hard disk, list the four stages.

4. Name which administrative tool you can use to manage Microsoft Windows 2000?

5. List three tasks that can be accomplished using the MMC.

6. How do you create or modify a hardware profile?

7. A physically separate unit of storage in Microsoft Windows 2000 is called, what?

8. What three file systems does Microsoft Windows 2000 support?

9. List the three different types of user accounts offered by Microsoft Windows 2000.

10. Which tool is used to create local user accounts?

11. What is a group?

12. What are some of the features of Built-in local groups?

13. In Windows 2000 Professional, how many concurrent connections can be made for file and print services?

14. What operating systems doesn't Windows 2000 Professional support for connections to file and printing?

8.25B LAB

LAB: INSTALLING WIN2K PRO FROM A CD-ROM

In this lab, you will install Windows 2000 Professional from a CD-ROM.

To begin the text-mode installation phase of Windows 2000 Professional setup

1. Insert the Windows 2000 Professional CD-ROM into the CD-ROM drive.

   NOTE:

   If your computer is configured with an El Torito-compatible CD-ROM drive, you can install Windows 2000 without using the Setup disks. You will run the Setup program by restarting the computer with the CD-ROM in the CDROM drive and then skip to step 4 in this practice.
   Insert the disk labeled Setup Boot Disk into drive A, and then turn on, or restart, the computer.

2. When prompted, insert Setup Disk 2 into drive A and proceed as directed for Setup disks 3 and 4.

3. When Setup displays the Setup Notification message on the Windows 2000 Professional Setup screen, read it and then press Enter to begin Setup.

   Setup displays the Welcome To Setup screen. Notice that you may either install Windows 2000 or you may use Windows 2000 Setup to repair a damaged Windows 2000 installation.

   NOTE:

   Notice at this point that if you want to quit Setup for any reason, you can press F3 to exit.

4. Read the Welcome To Setup screen and press Enter to continue.

   Setup displays the Windows 2000 Licensing Agreement (EULA) screen.

5. Read the licensing agreement, and then press F8 to agree with the licensing terms.

   Setup prompts you to select an area of free space or an existing partition on which to install Windows 2000. At this stage of Setup, you can create and delete partitions on your hard disk.

6. Press Enter to select the default C: partition.

   NOTE:

   In the event that you already have an operating system installed on the C partition, you may choose another partition. For the rest of the course, remember to replace C:\ with the appropriate location for your Windows 2000 Professional installation.

   If you have a version of Windows 2000 Professional already installed and you want to replace it with a fresh install, press Esc. When prompted, select the appropriate partition to install Windows 2000, press Enter, and follow the directions on the screen.

Setup displays the list of file system choices.

7. Ensure that the Format The Partition Using The NTFS File System option is highlighted and press Enter.

   NOTE:

   If you were to decide to format the partition with the FAT file system, Windows 2000 provides the Convert command, which you can use to convert a partition to NTFS without having to reformat the partition and lose all the information contained on the partition.

   Setup formats the hard disk, examines it, and then copies files to the Windows 2000 installation folders. This will take several minutes, and then the Windows 2000 GUI Setup will initialize.

   NOTE:

   If the partition is already formatted, Setup displays a Caution message indicating that formatting this drive will erase all files on it. If you see this message, and this is the partition where you want to install Windows 2000 Professional, make certain that this partition option is selected and press Enter to format the drive.

8. When Setup prompts you to restart the computer, remove all the disks from the disk drives, and then press Enter.

IMPORTANT:

If your computer supports booting from the CD-ROM drive and you don't remove the Windows 2000 Professional CD-ROM before Setup restarts the computer, the computer might reboot from the Windows 2000 Professional CD-ROM. This will cause Setup to start again from the beginning. If this happens, remove the CD-ROM and then restart the computer.

The computer restarts, and a message box appears prompting you to insert the CD-ROM labeled Windows 2000 Professional into your CD-ROM drive.

To begin the graphics-mode installation phase of Windows 2000 Professional Setup

1. Insert the CD-ROM labeled Windows 2000 Professional into your CD-ROM drive, and then click OK.

   The Windows 2000 Professional Setup wizard appears.

2. If necessary, click Next to continue.

   Setup detects and installs devices. This will take a few minutes. Setup configures NTFS folder and file permissions for the system files, detects any hardware devices in the computer, and then installs and configures device drivers to support the detected hardware. This process will take a few minutes.

   Setup then prompts you to customize Windows 2000 for different regions and languages.

3. Select the appropriate system locale, user locale, and keyboard layout, or ensure that they are correct for your language and location, and then click Next to continue.

   NOTE:

   You may modify regional settings after installing Windows 2000 by choosing Regional Settings in Control Panel.

Setup displays the Personalize Your Software page, which prompts you for your name and your organization name. Your default computer name is generated using your organization name. Many programs that you install later will use this information for product registration and document identification.

4. In the Name box, type your name; in the Organization box, type the name of your organization. Click Next.

   Setup then displays the Your Product Key page, which prompts you for the 25-character Product Key appearing on the sticker affixed to your CD case.

5. Type the 25-character Product Key that is affixed to the back of your CD case in the five Product Key boxes, and then click Next.

   Setup displays the Computer Name And Administrator Password page.

6. Type your assigned computer name in the Computer Name box.

   Note that Windows 2000 displays the computer name in all CAPS, no matter how it is typed in.

IMPORTANT:

If you do not know what your computer name should be, check with the instructor before assigning a name to your computer.

7. In the Administrator Password and the Confirm Password boxes, type the word **password**, and then click Next.

IMPORTANT:

Remember that the password box is CASE SENSITIVE! Also, for this practice section, you will use *password* for the Administrator account. However, you should always use a complex password for the Administrator account (one that others cannot easily guess). Microsoft recommends mixing uppercase and lowercase letters, numbers, and symbols (for example: !JdMlRc5CChJ%).

If there is a modem connected to the workstation to which you are installing Windows 2000 Professional, Setup displays the Modem Dialing Information page; otherwise, Setup displays the Date And Time Settings page. If your computer doesn't have a modem, you may skip to step 12.

8. Ensure that the correct country and region is chosen.

9. Type in the correct area code or city code.

10. If you dial a number to get an outside line, type in the appropriate number(s).

11. Make sure that the correct phone system is selected, and then click Next.

    Setup displays the Date And Time Settings page.

12. On the Date And Time Settings page, verify that the Date & Time setting and the Time Zone setting are set correctly for your location.

13. Select the Automatically Adjust Clock For Daylight Saving Changes check box so that Windows 2000 will automatically change the time on your computer for daylight saving time changes, then click Next.

NOTE:

If you had configured your computer for dual booting with another operating system that also adjusted your clock for daylight saving time changes, you would make certain to enable this feature for only one operating system. You should enable this feature on the operating system you use most frequently so that the daylight saving adjustment will occur only once.

Setup displays the Network Settings page and automatically installs network software so that you may connect to other networks and to the Internet. This may take a few moments. Once file copying is complete, Setup prompts you to choose whether to use typical or custom settings for configuring network components.

14. Select the Custom Settings option, and click Next.

    Setup displays the Workgroup Or Computer Domain page.

15. Click on the Install button.

16. From the pop-up menu, select Protocol and click Add.

17. In the Select Network Protocol dialog box, highlight NetBEUI Protocol and click Ok.

18. Verify that NetBEUI Protocol now appears in the list of Networking Components and click Next.

19. Choose the option No, This Computer Is Not on a Network, Or Is on a Network without a Domain. Make sure that WORKGROUP appears in the Workgroup Or Computer Domain box, and click Next.

    Setup displays the Installing Components page and displays the status as Setup copies files to install and configure Windows 2000 components. This process will take a few minutes.

    Setup next displays the Performing Final Tasks page and displays the status as Setup installs Start-menu items, registers components, saves settings, and removes any temporary files used for the installation. This process may also take several minutes.

20. Remove the Windows 2000 CD-ROM from the CD-ROM drive, and then click Finish to continue setting up Windows 2000 Professional.

IMPORTANT:

If your computer supports booting from the CD-ROM drive and you fail to remove the Windows 2000 Professional CD-ROM before Setup restarts the machine, the system might reboot from the Windows 2000 Professional CD-ROM. This will cause Setup to start all over again from the beginning. Should this happen, remove the CD-ROM and then restart the computer.

The system restarts, and the Welcome To The Network Identification Wizard appears.

To configure your network

1. To use the Welcome To The Network Identification Wizard, click Next.

The Users Of This Computer page appears.

2. Choose the option Users Must Enter A User Name And Password To Use This Computer, and then click Next.

   The Completing The Network Identification Wizard page appears.

3. Click Finish.

To log on as Administrator

1. In the Log On To Windows dialog box, make certain that it says Administrator in the User Name box, and in the Password box, type **password.**

2. Click OK.

   NOTE:

   If the Found New Hardware wizard appears, read the information, and then click Finish.

   The Getting Started With Windows 2000 dialog box appears.

3. Clear the Show This Screen At Startup check box, and then click Exit to close the Getting Started With Windows 2000 dialog box.

LESSON SUMMARY

In this lesson, you learned that installing Windows 2000 Professional is a four-stage process. You learned about each of the tasks that are completed during each of these stages, and then you installed Windows 2000 Professional from a CD-ROM. During the installation, you formatted your installation partition as the NTFS file system, installed the NetBEUI protocol and had the computer join the default workgroup.